TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1898.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

☞ SEE LAST PAGE OF COVER.

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The following lectures have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Evening Transcript." As here presented, the lectures are printed in full, and reports of the discussions following the lectures are added, these, where it appeared necessary, having been carefully revised by the speakers.

The Committee on Lectures and Publication take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the lectures and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

B. M. Watson,
J. H. Bowditch,
Aaron Low,
Committee on Lectures and Publication.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 1, 1898.

A duly notified stated meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

In the absence of the Secretary, by reason of illness, the President appointed Miss C. M. Endicott Secretary *pro tem.*

The following appropriations, recommended by the Executive Committee at the meeting on the sixth of November, came up for final action, and were unanimously voted, viz.:

For Prizes and Gratuities:	
For Plants for the year 1898	$2,000
For Fruits " "	1,732
For Flowers " "	2,668
For Vegetables " "	1,200
For Gardens, etc. " "	500
Total	$8,100

The President, as Chairman of the Executive Committee, reported a recommendation that the Society make the following further appropriations for the year 1898:

For the Committee on Lectures and Publication, this sum to include the income of $50 from the John Lewis Russell Fund	$300
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee . .	400

For the Committee on the Library, for the purchase of magazines and newspapers, binding of books, and incidental expenses of said Committee . . .	$400
For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of the Committee, and to be paid through the usual channels	250
For the salaries of the Secretary and Librarian and the Treasurer and Superintendent of the Building . .	3,000

These appropriations were unanimously voted.

The President reported the appointment by the Executive Committee of Charles E. Richardson as Treasurer and Superintendent of the Building, and Robert Manning as Secretary and Librarian, for the year 1898.

Professor Benjamin M. Watson, Chairman of the Committee on Lectures and Publication, announced that the Programme of Lectures for the season of 1898 had been printed and distributed to members, and expressed the gratitude of the Committee to the retiring Chairman, Mr. J. D. W. French, who had served so long on that Committee, for his assistance in preparing the present course of lectures.

E. W. Wood, Delegate to the State Board of Agriculture, presented his Annual Report, which was referred, without reading, to the Committee on Publication.

The Annual Report of Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, was also referred in like manner.

President Appleton announced that he had decided to defer the delivery of the usual Annual Address of the President to a later meeting, as there were important matters now under consideration which he wished to mention in it.

The President called attention to the Schedule of Prizes for 1898, and also announced that the first of the course of lectures before the Society would be given on the following Saturday.

Henry T. Clinkaberry, of Trenton, N.J.,

having been recommended by the Executive Committee for membership in the Society, was on ballot duly elected.

On recommendation of the same Committee

Peter Nøvik, Secretary of the Norwegian Horticultural Society, Christiania, and

Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge, were elected Corresponding Members of the Society.

Adjourned to Saturday, February 5.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, January 8, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The following lecture was delivered:

The Business Side of Fruit Culture.

By J. H. Hale, South Glastonbury, Conn.

Members of the Massachusetts Horticultural Society: I shall speak to you today on the Business Side of Fruit Culture. This is an important side in this country, and one which is growing in importance. This growth is hardly realized by one who is not in close touch with the subject. One branch in particular in which this growth is marked, and one which I have had especial opportunity of studying, is that of nurseries. Up to 1890 there had been, in this country, no investigations on this subject. In the Census of 1890 this question received special attention, and I was appointed by the Superintendent of the Census to take charge of and report on this branch of horticulture. I found during my investigations, which covered the whole country, that while, previous to 1800, there had been but few commercial nurseries in the country, there were, in 1890, nearly five thousand. Statistics showed that these nurseries contained the enormous numbers of 240,000,000 apple, 38,000,000 cherry, 49,000,000 peach, 38,000,000 plum, and other trees, as well as 271,000,000 strawberry plants, 86,000,000 raspberries, 49,000,000 currants, etc. These represent, however, a two years' supply. I was astonished at the great numbers, and it seemed as if the country would be overstocked. But when one comes to consider that carelessness in the nursery,

in transporting, and in receiving and planting, result in the loss of fifty per cent, and that more than fifty per cent of the remainder is lost by the poor treatment received by the trees after they are transplanted, leaving only twenty-five per cent which survive three years after leaving the nursery, and that only a small percentage of the remainder comes to perfect fruitage, it is apparent that the danger of overproduction is not so great after all. With commercial planters, on the contrary, nearly ninety per cent of the trees bought are made to grow; so that the man who has a *business* interest loses but ten per cent.

Among semi-tropical fruits we find that the growing of oranges, especially in California, has greatly increased — hardly 1,000,000 boxes in 1890, while the present season's crop promises 7,000,000 boxes at $2.00 or more per box in the orchard, and young trees already planted will soon increase this yield to ten or twelve million boxes. This is practically a new field of orchard work, and though orange growing is not of special interest to us in New England, every pomologist should feel an interest in all departments of fruit growing in his own country. Every commercial fruit grower should keep in touch with the details of all such matters. He must also keep in touch with the market, know what the demand is for, and know what prices the different fruits bring, and why it is so. Unless he does this he will not get his full reward. He must give no less attention to growing, and more to keeping abreast of the times.

Another field of study for the commercial fruit grower is that of soil. Special soils are needed for special varieties of fruits, and a man must study closely the soil conditions and the adaptability of varieties to the various soils. He must also watch his neighbors and see what they are doing, and learn from the mistakes of others as well as from their successes.

But the greatest thing for him to study is himself. Does he *enjoy* the plants? Does he enjoy working and planning for them? To attempt to go into commercial fruit growing just to make money is worse than useless. A man does that best which he most enjoys. Whatever you do you want to get pleasure out of. So do not enter commercial fruit growing unless you have a love for it, and so are better able to attain the higher possibilities of fruit culture. And one must not be discouraged by the various failures or misfortunes that may come to him in

his work. A man who will become easily discouraged by a frost, a drought, insects, or fungus pests is not likely to succeed.

Just what fruits one should plant depends to a great extent upon the farm itself, upon what the man enjoys, and to a degree upon the markets which he aims to supply.

The new race of Japanese plums are fruits to which a good deal of attention has recently been given. They are early and abundant bearers, and have the advantage over European plums of being better adapted to our soils, and cover a very wide range of season — from early June till October. Many of them are of high quality, and will keep in good condition from one to two weeks after being picked ripe from the tree.

Of our older fruits the apple is the surest and best. It is easy to grow and will nearly take care of itself; still that is not the best way to grow it. We have lately heard a great deal about "abandoned farms." Many of them may not be adapted to growing the finer crops, but it seems to me that many of them offer a fine opportunity for growing apples. When we consider how well the apple tree does without much culture, and when we note the ever increasing demand of the world for apples of fine appearance and high quality, it seems as if it would be a good thing to devote some of the abandoned farms to high grade apple orchards. People will generally say that there is not much profit in planting apple trees on these hilly farms in New England, but in my opinion the man who will plant a hundred or a thousand trees on such a farm, and will give them thorough culture, feeding, spraying, and pruning, and will pay careful attention to thinning the fruit, will get winter apples of fine appearance and good quality, — too many have fine appearance and *poor* quality, — and find a ready market for them, always at a price that will pay a profit. But in future years high quality must also go with fine appearance.

The talk of an "off year" is generally because the orchard is in the hands of an off man. When apple trees bear very heavily they exhaust the vitality of the tree, and the buds for the following year get insufficient nourishment, or possibly none are developed, and the next year a very small crop, or more likely no crop, is the result. The remedy for this is in thinning the fruit on the trees annually from their earliest bearing. This ensures annual fruitage except occasionally when the crop is lost through

climatic conditions. I will make the prediction that the man who will invest capital in planting winter apples, keeping them in good condition according to the best modern methods, and carefully thinning the crops, will receive three or four times the annual dividend that the average of manufacturing enterprise in Massachusetts will pay. Right apple culture is sure to pay better than manufacturing, and for many years to come there will be less competition between apple culturists than between manufacturers.

In cultivating the peach the climatic conditions are such that the fruit grower has to be very alert to prevent damage to his fruit buds in Massachusetts. East of the Connecticut river peaches may be grown well on many acres of high, dry lands by carefully studying the conditions, by feeding well, and by giving good frost drainage. It is best to plant on an abrupt knoll, so that frost will run off quickly. By selection of land affording the above conditions peaches may be grown with success. They may be grown profitably too, for there is a great demand for good home grown peaches ripened on the tree, as is evinced by the carloads brought here from other localities and sold at good prices, though far inferior to those that may be grown here.

We will next consider small fruits. The markets give liberal returns for fruit of the highest grade. We shall find, however, that most of the *fine* canned fruit put up in glass for the best market is that brought from across the water, and I wonder that we Yankees have not awakened to the possibility of taking this market for our own. Certainly our boys and girls can do as well as the peasants of Europe.

There is another fruit (if such it may be called) which is very interesting to me, and that is the chestnut. In southern New England the trees in field and forest grow luxuriantly and bear full crops, though the nuts are small. When the right time comes the boys and girls rush out and gather the nuts and carry them off to market. How greedy the markets are for them! The whole supply is gone in six weeks, though the people would eat them all winter. We import large quantities of foreign chestnuts, but if we could get enough native chestnuts of a large size, with the fine quality of our nuts, we could displace the foreign supply with our own product. Still better results could be obtained by grafting our chestnut sprout lands with large, sweet

Japanese varieties. Money invested in growing chestnuts for market in this way would pay large rewards, for native sprouts grafted with the early bearing Japanese varieties will furnish paying crops in six or eight years, and this would certainly be a promising industry for the people of New England, wherever the native chestnut grows freely.

The whole theory of successful soil culture consists in selling water, because it is the cheapest gift to man. The grain farmer cuts great chunks off the plant food in the soil and sends it away. So does the potato grower, the market gardener, the hay farmer, and, to a less extent, the dairyman. The fruit grower keeps most of his plant food at home and sells water just as truly as though he tapped the spring and piped its water down into the market, only the fruit baskets take the place of pipes.

Fruit culture is one thing that enables us to sell watered stock and satisfy our customers. Disguised in the luscious strawberry, blooming raspberry, ebony blackberry, or beneath the rosy skin of some one of our delicious tree fruits, water finds a ready market at prices that leave "millions in it" for the one who most skilfully assists Nature in "turning water into wine" (fruits). Every season occurs the apparent miracle of turning water, often impure and unwholesome, into rich and healthful fruits, which are "absolutely pure," and free from germs or microbes.

How best and most economically to assist Nature in the work, and reap the greatest rewards, is the question. How shall the watercourses be turned into the channels of tree, plant, and vine, and help to turn the wheels of fruit culture in such a way as to give the best final results?

A deep ploughing and a thorough pulverization of the soil will make it capable of holding much more water than before. A cubic foot of soil will hold, after being pulverized, a hundred times as much water as that soil would hold before. This water will be taken up by the roots of your fruit trees and so will swell up your fruit. If you cannot keep enough moisture in the soil by pulverizing you will have to try to do it by mulching, and if you cannot by mulching then by irrigation, but let me say that you cannot irrigate a large tract with windmills and tanks.

Just at present a bushel of apples, wheat, or potatoes sells for about the same price, $1 for 60 pounds. In the apples we sell 1 ounce nitrogen, 1¼ ounces potash, and ½ ounce phosphoric acid,

which costs 1½ cents, leaving 98½ cents for the water. Potatoes take from the farm 4 ounces nitrogen, 2 ounces phosphoric acid, and nearly 5 ounces potash, valued at 6¼ cents, leaving 93¾ cents for the water. The bushel of wheat has 1½ pounds nitrogen, 10 ounces phosphoric acid, and 5 of potash, worth 30¼ cents, leaving only 69¾ cents for the water. Fifteen bushels of apples take no more plant food from the soil than one bushel of wheat, yet bottled up under their bright skin you can sell 765 pounds of water for $14.77! To sell the same amount of water in wheat would take 84 bushels, or the product of five average acres, while the apples would come from one well grown and well nurtured tree. Eighteen pounds water, ¼ ounce nitrogen, ⅓ ounce potash, and so little phosphoric acid that you cannot see it with a microscope, all costing less than ½ a cent, make 10 quarts of strawberries, that sell for $1, the same as the bushel of wheat, which takes sixty times as much plant food from the soil. Selling water in a strawberry basket enriches both the farm and the farmer.

My trial bed and test plot of strawberries is on medium sandy loam soil, well pulverized to the depth of 15 inches, then subirrigated by ¾-inch perforated iron pipes, lying 6 feet apart, 1 foot below the surface. Every condition is as favorable as I know how to make it for pumping water into strawberries, and so securing the greatest size and yield. It contains 12 plants each of all leading varieties. Each plant is allowed 2¼ square feet of land. Six of the largest and most productive varieties yielded an average of a little more than one quart to the plant, 18,360 quarts per acre. The average for the whole bed, including many shy fruiting varieties, was ⅝ of a quart per plant, or 13,115 quarts per acre, 400 per cent increase over 3,200 quarts, the average yield in the State. These berries were so puffed up in size and beauty by extra conditions that their selling price was 50 per cent above average market prices.

If with water you can float 400 per cent increased yield into market and soak the price up 50 per cent more, does that not show profit enough to keep all soil pumps well oiled and leave a good margin for outside fun? Three hundred and forty of my big Japan plums, 82 per cent water and 18 parts solid, made a bushel that sold at $4.80, while 720 of same varieties 26 parts solid and only 74 of water, made a bushel that sold the same day in the

same market at $2.56, or over $100 per barrel for the extra percentage of water in the larger plums. Open up the water-courses of the soil, and be ready for the flood tide of prosperity; it is of no use to dam it with "I can't!"

My big peaches — 100 to the bushel — 92 parts water to 8 parts solids, sold at $5; the same variety, 400 to the bushel, were 84 parts water, 16 of solids, and sold at 70 cents per bushel — $4.60 for the water and 40 cents for the solids in the large fruit, and 58.7 cents for the water and 11.3 cents for the solids in the small ones, or $5.64 per gallon for *extra* water.

Next to thorough soil culture is a matter which I think is of great importance, and that is cultivating the plants late into the fall. For the more thoroughly we can cultivate the plants late in the season the better will the fruit buds winter. If we cease culture early, wood and fruit buds mature early, so that the leaves fall off too soon, the warm weather of late fall will sometimes start the buds of next year to swelling, and then when the severe winter weather comes the buds are winter-killed. There is, however, even danger of cultivating *too* late. Yet for all this it is often the late growth of a plant that stands the winter best, and you can notice, among tender blackberries and raspberries, where a plant was exposed, that the little late suckers withstood the cold while the early matured canes were often winter-killed.

To keep foliage in good condition we must occasionally spray the plants. The finest fruit comes only from trees and plants that have healthy foliage. Then there is another important fact. I have seen apple and pear orchards which have failed to fruit because of too much foliage and soft wood growth. This fault can be corrected by witholding stable and other nitrogenous manures and by root pruning of over vigorous trees, which treatment will cause them to form fruit buds and become productive.

The next subject to consider is that of cover crops. The land in orchards should not be left bare through the freezing of late fall and early spring. After fertilizing, leaving the ground bare is wasteful, and a cover crop should be sown wherever possible, not only to prevent the waste of fertility, but also as a protection to the tree roots. These cover crops should be of such plants as will gather in the free nitrogen of the air, so that when they are ploughed under, the soil will be enriched. In Connecticut I find clover to be one of the best crops to plant. In Western New

York and Michigan they use various kinds of vetches. The cover crop should be sown in August or early September, and should be ploughed in in the spring. It should be done early in the spring — not left till May or June. This treatment will many times repay the planter. As I said, it should be ploughed in early in the spring, and I should especially state that this means *shallow* ploughing. Deep ploughing is apt to be pretty dangerous. This cover crop is very good for green manuring. After ploughing in in the springtime, a summer green crop may be sown if it is desirable to enrich the land at small cost, and I find that the Southern cow pea does very well. Early in June I should plant two or three rows of cow peas in drills between each two rows of young orchard trees. Then culture can be continued.

All purchased fertilizers cost a good deal, and yet commercial fruit growers need buy scarcely a dollar's worth of high priced nitrogen. Mother Nature will give him a very good fertilizer if he uses these cover crops, and he need never buy nitrogen. Of other kinds of fertilizers phosphoric acid and potash are most needed, but in all this question of fertilizers the local soil conditions have to be studied, and plans made with regard to them. But one thing must be remembered, and that is that stable manure must be avoided in most orchards after they come of fruiting age.

We now come to the subject of diseases and insects which injure the health of fruits. The injurious insect of which we hear a great deal of late is the San José scale. There is, however, one very good thing about the San José scale. It has scared the fruit growers. Men are now looking over and examining their fruit trees as they never did before, and they examine critically every tree they buy, and as a result their orchards are likely to be much better known and cared for than ever before. So the San José scale, a dangerous pest as it is, has proved a great blessing. And the San José scale is the one thing that will kill an apple tree. So apple trees that have rather been left to themselves in the past must now be carefully looked after or go down. This of course means better apple culture and better apples.

Then there is the disease of yellows, which attacks peach trees, and spreads easily from tree to tree, and if left will kill the trees. In eradicating this disease the most vigorous measures must be taken. Every infested tree must be taken up and

burned, root and top. A man who pulls up and burns a tree infested by yellows does good missionary work. I take such a tree out the first day I see it. I recently sold a lot of peaches here in Boston market, and near me was a man selling two loads of peaches which were full of yellows. He got 25 cents a basket for his peaches, while I got $1.35 for mine. I was ahead $1.10 on every basket, because I was "scared" of yellows. The man who is scared is bound to make money. He is alert to the danger that threatens his business, and so uses every known means to check loss.

Then another disease is the rust of the strawberry, or the red rust, as it is called. On some soils and with some varieties, this does not spread, but on others it does, and the treatment to give the plants is to dip them, when setting out, into a solution of Bordeaux mixture, then to spray once or twice during the summer with the mixture, and again once or twice early in the following spring. It may cost $15 per acre through the season to spray; it will pay, however, and pay handsomely.

We will next consider the thinning of fruit. I wonder how many of you practise the thinning of fruit on your apple trees. Now, apple trees will do a good deal if you do nothing for them. But the man who wants good apples — apples that will pay — in the future will practise thinning his fruit. I should take a young tree which attempted to produce one hundred apples, and remove at least fifty of them, leaving not more than fifty to ripen. The next year, if it attempted to produce two hundred, I should leave one hundred or less, and the next, if it had one thousand apples, I should leave three or four hundred only. By this method I should get that tree into the habit of annual bearing. The man who will make fruit growing a profitable business will thin all his fruit. A peach tree that will set one thousand peaches needs to have six or seven hundred thinned off. The commercial side of fruit growing demands thinning of nearly all your fruits. You will get more bushels to the tree within reasonable bounds; the more you throw away the more pounds or bushels you will have left, increased size more than making up loss in number. In thinning Japanese plums I should leave the fruits four inches apart, and peaches from five to six inches. If you make a practice of thinning your fruit from the trees, you will usually get four dollars for one. I have often had it in-

crease the crop fifty per cent, and the selling prices five hundred per cent.

The next thing after producing fine fruit is to know how to sell it so that it will bring the most money. Great care needs to be given to the picking of fruit, and careful attention to the marketing. You want to go into the market and study the sales of fruit. You will find that that which brings the best price is that which is the neatest, the fullest, and the most honestly packed for local markets. You want to leave the small fruits until thoroughly ripe, and then pick in the cool of the day. The fruit should be packed always in a cool place and put in tight packages, for the less the air reaches the fruit the better it will keep. Then the crates and boxes should be kept away from the air as much as possible. In packing you want to grade your fruit. The finest will go for fancy, then number one and seconds. All, however, should be good, sound fruit, of as even size and quality as possible. The three or four grades should be uniform throughout. Ask your dealers what kind of packages sell best. Then get the neatest and most attractive packages you can, and have the fruit put up as neatly as possible. It should be graded by hand. In many fruit districts they have a method of grading tree fruits by machinery, and it appears at first sight to do no harm to the fruit. But in a few hours the fruit will lose color by this method of grading. Then you want to pack honestly, from top to bottom, and just as full as possible. But I would not get men to do the packing. Hire girls for this part of the work, and you will find that the work is better done. Next label your brand and then strike upon a good dealer. Tell him it is a good thing, for you know that it is, and make him know it too. Have a good commission man, and, if possible, make him come out to your place and see your orchards, and study your methods of doing the work. Have him *believe* in your fruit.

The business side of fruit growing means belief in yourself, and then getting those with whom you trade to believe in you.

Finally, believe in your line of business. Don't get into it until you have carefully thought it out and made up your mind that you can succeed in it, and then stick to it all the time, on the alert at all times for most approved methods and varieties.

Discussion.

A gentleman asked what treatment was best for the black knot.

Mr. Hale replied that it should be cut out thoroughly as soon as it appears. Then the trees should be sprayed with Bordeaux mixture. This disease is now known to be controllable.

C. S. Pratt asked how to cool off berries before packing them.

Mr. Hale replied that if they must be picked in the heat of the day he would pack in ventilating crates and then haul the crates to a cool place.

Samuel H. Warren inquired whether it was better to pack apples in barrels or in crates.

Mr. Hale replied that he should use whatever kind the market demanded. He believes, however, that the time is coming when barrels will be abandoned for crates or boxes. The former, being easy to roll, make injury to the apples greater than would be the case with boxes.

Mr. Warren said he wished to ask about spraying strawberry plants for rust. The Experiment Station at Amherst had not been successful in this treatment, and he should like to know what the reason was.

Mr. Hale said that as he did not know the conditions he could not say; but on his farm the Downing and Marshall strawberries, which rust as quickly as any varieties, are kept wholly free from rust by the use of Bordeaux mixture. He would spray at least once in the fall and twice in the spring before fruiting.

Mr. Warren wished to know whether Mr. Hale had left any plants unsprayed, so that he could tell whether the plants on his farm would have been affected by rust at all.

Mr. Hale said he had left some and they were attacked by the rust.

A lady asked what varieties of strawberries the lecturer would recommend, and whether he thought hill culture or matted rows the most profitable way of growing plants.

Mr. Hale replied that as to variety it would depend largely upon the soil. As to the most profitable way of growing he would say hill culture by all means. People sometimes prefer matted rows, but chiefly because that is the easier way.

Benjamin W. Putnam remarked that the lecturer had said that rust reduced the yield of the strawberry plants very much, but

that he knew a strawberry grower who said the rust did not harm the plants; he should like to know how much Mr. Hale thought rust hurt the plants.

Mr. Hale replied that he had known the yield to be cut down seventy-five per cent by rust.

Mr. Frost wanted to know whether the lecturer meant to say that hill culture would be better than matted rows.

Mr. Hale said he certainly did.

Mr. Frost said that the hill system had been tried here long ago and cultivators had returned to the matted row system. He thought that the best fruit came from matted rows, while in the hill system one-third of the hills would be found dead.

Mr. Warren said that Mr. Frost practically cultivated in the hill system.

Thomas Harrison said that he did not, himself, find the rust very troublesome, and wished to know why he had not.

Mr. Hale said that rust spreads according to the weather conditions. Warm, damp, cloudy weather made it spread, while the opposite conditions would not favor its increase.

Robert Farquhar wished to know what remedy Mr. Hale would recommend for the San José scale.

Mr. Hale replied that whale oil soap was by all means the best remedy. However, he had had very little trouble with this pest.

Professor W. M. Munson said that he thought the reason Mr. Hale had not had trouble with the San José scale was because he had been using Bordeaux mixture.

Mr. Harrison said he had found this pest some time ago on vines of the Concord grape. He thought it might have been brought on some California grape vines. He had, however, pulled up and burned the vines, and had never seen the scale since. Mr. Harrison also said he should like to ask whether Mr. Hale had taken into consideration the cultivation of the red currant.

Mr. Hale replied that the market for red currants had been largely overstocked the past ten years.

In answer to further questions Mr. Hale said that natural apple trees are best to graft on. In treating apple trees he would trust to chemical manures, and would mulch if there was danger of drought. Apple trees, if well cared for, would not need to be scraped, but in case of a person buying an old orchard which was in poor condition he would advise scraping the trees and then

spraying twice with copper sulphate. It would be best to head trees rather low, as the more work that can be done from the ground the better. It is better to grow trees with one leader, for two or three leaders tend to break down a tree.

Arthur M. Clement expressed himself as being in favor of a peach yellows law, and wished to ask Mr. Hale why the peach yellows law in Connecticut was repealed.

Mr. Hale replied that a combination of circumstances had caused the repeal of this law. For one thing, many of those who were against it were opposed to progress in agricultural matters generally. The law had worked admirably for five years. Some private growers who had only one or two trees which bore well, though affected by the yellows, felt it unfair that their trees should be destroyed, not seeing how this would benefit the community, but only how it affected themselves at the time; they would rather have poor fruit than none. All the commercial fruit growers wholly favored the law. He thought the law would be reënacted the next year, as it had been repealed by combinations of votes of four or five factions. Not one single progressive horticulturist in Connecticut wanted its repeal.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 15, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture, illustrated by many stereopticon views, was given:

HORTICULTURE IN HOLLAND: DECORATION IN PUBLIC PARKS, BULB GROWING, NURSERY STOCK AT BOSKOOP.

By JOHN K. M. L. FARQUHAR, Boston.

Holland presents to the horticulturist many interesting features peculiarly her own.

Her wet soil and moist atmosphere have rendered her unable to enter many avenues of horticultural industry open to Germany and France, but of the few available to her she has not failed to make the most.

For two hundred years she has supplied the nations of northern latitudes with bulbs from which to raise flowers to gladden their conservatories in winter, and their gardens in spring, and she has established a constantly increasing business, the monopoly of which seems assured to her for ages to come. Her exports of bulbs and nursery stock now aggregate five million dollars annually.

Such elaborate flower stores as we have in Boston are not to be found in Holland, for as we pass through Rotterdam we see a flower market where a few men and women do the business, the flowers being chiefly of the more ordinary kinds — bunches of candytuft, stocks, sweet williams, mignonette, and outdoor roses. The flowers are brought here in the morning, sold at low prices, and by noon the business is over. Amsterdam has a similar market.

Dutch horticulturists devote most of their energy to supplying the wants of other nations, their home trade, especially in cut flowers, being exceedingly small. Many of the residential streets, however, have a strip of grass with shade trees and tastefully planted flower beds on one or both sides of the canals which occupy the centre. Even in the narrow business streets of Rotterdam we find valuable space devoted to trees — more, I think, than our citizens would be willing to allot under similar conditions.

The Dier Gaarde (which is a botanical and zoölogical garden combined) presents many features of interest. It is really an improved marsh, with the inevitable canals widened here and there into ponds, the excavated material adding to the land area. The surface being perfectly flat, the landscape gardener has had to depend largely on the grouping of trees and shrubs for variety of scenery.

The shrubbery is extensive and select. In addition to such shrubs as we see in our gardens, we find the yew, the bay, *Aucuba Japonica*, *Araucaria imbricata*, golden thuja, green and variegated hollies, and many other choice species not hardy in New England.

There are magnificent groups of Japanese maples, and roses grown in standard form — that is, grafted on stems three or four feet high; also fine collections of irises, pæonies, and other hardy plants.

There is a large curvilinear iron-framed conservatory which contains a creditable collection of palms, cycads, and other trop-

ical plants. Also an aquatic house in which was a fine plant of the great annual South American water lily, *Victoria regia*, in bloom.

In Holland we find no such gigantic greenhouses as may be seen on the larger estates in England, like Chatsworth or Sion House; hardy trees, shrubs, vines, and herbaceous plants being more generally depended on for landscape decoration. This policy we find successfully exemplified in Boston's new parks.

The Dier Gaarde is, however, a *garden*, and here we find a number of tastefully arranged flower beds. Visiting this place, several years ago, I found more than half of these beds planted with geraniums. Now we find that the geraniums have given place to tuberous and fibrous rooted bedding begonias. Holland has only been keeping in line with other nations in making this change. In England, France, Germany, and even in our own Newport, we now find begonias the most popular class of bedding plants. They are used most extensively, perhaps, in Paris.

The dwarf forms of *Begonia semperflorens* are largely employed, and these have been found to do well in this country, especially the varieties Vernon and Erfordia.

In France the varieties of *Begonia fuchsioides* and *B. Wiltoniensis* and the dwarf, compact, tuberous sorts are in favor. In the Parc Monceau, in Paris, I beheld a bed of nine thousand plants of the last mentioned, with small, double, Jacqueminot-rose-color blossoms, which was truly gorgeous.

I do not wish, however, to convey the impression that geraniums have been wholly discarded as bedding plants; they will always be used to some extent.

I will not trespass upon your time to speak further on bedding plants except to say that set figures are giving place to simple mixed beds. For example, a bed composed of *Calceolaria rugosa* (yellow), purple heliotrope, and *Centaurea candidissima*, set promiscuously with a border of achyranthes, was one of the most pleasing.

One of the pleasantest parks in Holland is the Wood-land, surrounding the summer palace at The Hague. The Wood covers an area of four square miles, and is intersected by magnificent avenues. Situated as it is near the most modern and fashionable city of the country, and convenient to Skevening, where tourists

and invalids resort from all parts of Europe for its famous wind baths, the Wood is much frequented.

About the palace (where John Lothrop Motley, of Boston, spent many an hour as the guest of the queen while resident at The Hague gathering material for his famous history, "The Rise of the Dutch Republic") there is little floral decoration, and it can well be dispensed with, for the rustic beauty of this sylvan scene would not be improved by it.

In Haarlem there is a similar wood which has been used as a place of public recreation for more than five centuries. In this wood, in 1420, Laurens Koster is said to have discovered the art of printing, while cutting figures on pieces of stick and making impressions with them for the amusement of his children. Among the trees we find oak, elm, beech, birch, linden, maple, ash, and horse-chestnut.

Haarlem is the largest city of North Holland, and the trade centre of the bulb growing district. In the suburbs we find many luxurious residences, with ample grounds, many of them the homes of wealthy bulb growers.

We proceed by steam train from Haarlem, by way of Vogelenzang, where we pass through extensive bulb fields, towards the Lake of Haarlem. There is, however, no Lake of Haarlem now; only a great canal, 38 miles in length, from 115 to 130 feet wide, and 14 feet deep, in which ships sail and steamers ply, surrounding 70 square miles of low land that fifty years ago was a lake. This region is of interest to us, because along the western portion of the canal we find the finest hyacinth ground in Holland.

In 1837 the king appointed a commission to consider the best means of draining the lake — partly on account of the known richness of its bed, but chiefly because of the danger of inundation to which the cities of Leyden and Amsterdam were exposed by the rising of its waters during hurricanes.

The commission found the project practicable, and the great canal was built for the double purpose of conveying the water to the sea and to accommodate the shipping, which had been heavy on the lake.

The water was pumped from the lake into the canal by three engines, each capable of raising one hundred and twelve tons of water at a stroke, or a million tons in twenty-five and a half hours, and it took these three monsters four years to pump the

lake dry. The vastness of the undertaking will be better understood, perhaps, when I tell you that the area of this former lake now supports a population of ten thousand.

The soil is of various kinds — peat, clay, and sand, the last being what is chosen for hyacinth culture. It is prepared by being given a heavy application of cow manure. The bulb growers use manure lavishly, and it is brought to the fields in boats. It may come from Leyden, Amsterdam, or Rotterdam, as these and other cities are accessible by water, through the network of canals which penetrate the country.

Let us now look upon a field on which manure has been placed, ready to be spread and dug in. The quantity put on seems large, but this is necessary, especially for hyacinths, which must be grown in sharp sand without admixture of loam, peat, or clay. So essential is this condition held to be that the leading hyacinth specialist in Holland showed me with much enthusiasm a field (or rather a series of plots intersected by canals) covering forty acres, from which three feet of mixed alluvia had been removed, in order to reach a stratum of sand suitable for hyacinth culture.

We shall now look at one of the reclaimed fields on which workmen are engaged in planting bulbs. Hyacinths, narcissuses, and tulips are set in trenches six inches deep; crocuses, scillas, and snowdrops in trenches three inches deep.

Before cold weather sets in, all the planted fields are thickly covered with reeds, which grow along the edges of the canals, and are also cultivated in the north of Holland for this use.

Great care is taken to prevent frost from reaching the bulbs, for as they are planted early in autumn they soon make long roots, and frost reaching the bulbs would raise them up and detach them from their roots. I believe that among our New England cultivators this is a frequent cause of failure to obtain the best results.

The spring flowering bulbous plants are rapid growers, requiring a large supply of nourishment, and unless their roots are well developed in advance of the top, and kept in good condition, they will be unable to furnish the needed food, and failure, or partial failure, will result.

Growers who would sell direct to seedsmen must grow and be prepared to furnish bulbs of from four hundred to five hundred

sorts of hyacinths, which have distinct and well-defined characteristics. In fact, the growers and many dealers can distinguish many of them from the appearance of the dry bulbs.

Fifty years ago the growers generally had longer lists than now, and the double sorts were most esteemed. Now the single sorts are preferred, as they usually produce larger and fuller flower spikes.

The propagation of hyacinths is by offsets, which form at the base of the bulbs. For propagation the largest bulbs are selected. Each bulb is cut across the base several times, or has the base hollowed out, to increase the number of offsets. They are allowed to dry in the sun, and are planted in September or October.

The hollowing-out method gives more offsets than the cross-cutting, but it does not succeed with all sorts, and the bulblets being smaller take a year longer to attain full size.

The variety of which the greatest number is grown is the single pink Norma, and when one grower gives an estimate of the extent of another's hyacinth trade he states how many thousands of Norma he grows, just as our printers estimate the work of a compositor by the ems he sets. I know of one grower whose trade requires 80,000 Norma annually, the product of about two acres.

Now we see a field of tulips in bloom. In the distance is a stack of reeds which had protected them during winter, and which are stacked for use again. They can be used for three or four years, and look not unlike small cane stakes, such as we use for staking plants.

Next we see a field bordering on the Lake of Haarlem district. In the distance you can distinguish vessels on the great canal, while the dark lines running across the fields represent smaller canals. You can also see a windmill used in pumping water from the smaller canals into the main one.

Now we see a more extensive field of tulips in bloom. The trees on the right are but single rows of poplars on each side of a canal. The poplars are trimmed each year, and while affording protection from wind do not sap the ground.

The average grower must cultivate in all about four hundred and fifty varieties of tulips. Of these about four hundred are varieties of the ordinary garden species, *Tulipa Gesneriana*, which was introduced into Western Europe from Turkey in 1554.

There are about fifteen varieties of the dwarf sweet-scented Duc Van Tholl tulip (*T. suaveolens*), which in Europe are extensively used for winter forcing.

The famous Semper Augustus tulip, which during the tulipomania in Holland was the most prized sort, and which sold for about two thousand dollars apiece, is not now to be found.

The propagation of tulips is by bulb offsets, each root producing two, sometimes three, saleable bulbs, and perhaps one or two of smaller size which require another season's growth before they are fit for market. They are also easily raised from seeds, the seedlings coming at first self-colored. While they remain self-colored they are known by the name of "Breeders." These have been made very popular the past four or five years by giving them the name of "Darwin" tulips. After a few years of cultivation they break away from their original color.

If a white tulip becomes striped or marked with another color it is called a Bybloemen. Of this class the rose or red-tinted Bybloemens, known as "Roses," are perhaps the most desirable. A tulip having a yellow ground marked with another color is called a Bizarre.

In the early part of this century tulips having variegated flowers were the most esteemed. Today such self-colors as Gold Prince, the beautiful rose-carmine Proserpine, Vermilion Brilliant, and the White, Yellow, and Scarlet Pottebakkers are the most prized. There are, of course, exceptions; the most conspicuous is the noble Kaizerkroon — crimson, with a wide edge of yellow.

From a million and a half to two millions of tulips are now required annually to supply New England.

The tulip has become, with us, the most popular of the spring flowering bulbs and, compared with other spring bulbs, we use a larger proportion of them than other nations do.

As we look at these views we get an idea of the vast area devoted to tulips. Here is a view taken from near the railway station at Venenburg, showing in the distance the village of Hillegom.

Here we have a view of beds of tulips, which shows the single rows of poplars dividing fields or bordering canals like latticed fences.

Here is still another field of tulips, taken so as to show one of the canals, which is probably ten or twelve feet lower than the great canal.

At the present time daffodils are receiving more attention from hybridizing than any other class of bulbs. There are now in Holland yellow daffodils as much larger than the Emperor and Empress varieties of *bicolor* as these exceed the old Trumpet Major. One, Narcissus Victoria, has already been offered, and others will follow when the stocks become large enough.

Although the largest and finest bulbs still come from Holland, daffodils are extensively grown in England, Ireland, the Island of Guernsey, and France, and in talking recently with Dr. Campbell, of the University of California, he said that he believed his State would within a generation supply a large proportion of the narcissuses used in this country.

I cannot pass this part of our subject without expressing our indebtedness to Mr. Peter Barr, of London, who has done so much to arouse interest in daffodils. He offered substantial prizes for the best collections of them at the London exhibitions, at which his son Rudolph, when only ten years of age, was a frequent competitor; but his father insisted that he should carry the flowers in a basket without the names, and that he should name them himself in the show room. I have seen him thus name over sixty sorts. The beautiful Poeticus Poetarum was saved from extinction by Mr. Barr, and he has added many choice sorts to modern collections.

Japanese lilies are seldom grown in Holland now: the Dutch dealers find it cheaper to import them from Japan. They are usually shipped by way of Vancouver and New York. The Dutch still receive many orders for them from this country, which involves the shipment of them from New York to Holland and back needlessly.

It is a singular fact that double snowdrops do not succeed in Holland, and that the Dutch obtain the bulk of their supply from Lincolnshire, England, where for many years they have been collected by the chimney-sweeps as they travel about the country, and, when dried and cleaned, are sold to the bulb dealers in Holland.

Let us look upon one of these fields three months later. We see a score of men on their knees, some of them having their hands buried in the sand. It is harvest time, and they are lifting bulbs. No spades or forks are used lest the bulbs should be injured; the men dig them out of the loose sand with their

hands. The bulbs are laid carefully in baskets and conveyed by boat to the warehouses.

The workmen still wear wooden shoes, not altogether for economy: they are believed to afford better protection from rheumatism, which is prevalent in Holland, than leather. They are made of willow wood, which is light and not liable to crack.

The bulbs are conveyed by boat from all parts of the farm to the warehouse, a canal leading up to or inside of the buildings. These large storehouses, two stories high, are shelved with strong slats from the bottom to the top, the shelves being eight inches apart. As you look through the windows you can see the shelves packed with bulbs to dry.

The lower floor is invariably devoted to hyacinths, which are never laid more than two layers deep on the shelves. Tulips, being lighter to handle, are taken upstairs and similarly stored, but four or five layers deep.

Great care is exercised to have the freest circulation of air through the building, but no direct sunlight, which would crack the skins of the bulbs.

When sufficiently dry the bulbs are counted up into lots of perhaps 100, 250, or 500, as convenient, and placed in bags which are left open. When they are needed for shipment buckwheat chaff is put in to prevent bruising, and they are then packed up for transport over the world.

The value of bulbs exported annually from Holland aggregates $3,000,000. England takes half of the crop, the United States and Germany each to the value of about $300,000, France and Russia each about $200,000, and Norway and Sweden together about $150,000 worth.

On the southerly side of the Lake of Haarlem are the well-known nurseries of Boskoop. There are over four hundred nurserymen here, and they cultivate land which in almost any other part of the world would have remained salt-water marsh. So low was this region that to get land at all, the canals, which elsewhere are usually six feet deep, had to be dug eighteen feet deep, and frequently they had to be paralleled. The land has been made in plots about a hundred feet wide and half a mile in length, the land surface being about eighteen inches above the water in the canals.

The soil is chiefly peat, which is improved by having sand or

clay mixed with it. It is very rich, and the deposits from the bottoms of the canals, which are dredged out every autumn, form sufficient dressing.

Here we have a field of clematis, the growth of a single season, and here is another view showing clematis of one season's growth.

Plants make wonderful growth here — everything seems to luxuriate; and as we travel through these interesting fields and cross the canals on little plank bridges from plot to plot, and nursery to nursery, we note how carefully every foot of the precious earth is utilized.

As we look at another view showing large plots of Chinese lilacs let me tell you that very few (if in fact any) of these Boskoop nurserymen carry stock of all the lines they catalogue. Each grows a few specialties and buys the rest of his neighbors. These nurserymen have formed a society known as the "Association Flora of Boskoop," which seeks to promote their interests at home and abroad, and regulates the terms of sale between themselves.

The moist condition of the soil of the Boskoop nurseries, due to its being a spongy peat and its surface from sixteen to twenty feet below the Amsterdam high-water mark, has its effect upon the plants grown in it. They develop softer wood and the roots are less branched than those grown on higher and drier land. I have seen hybrid roses with stems twice the usual thickness and almost as soft as cabbage stalks. These frequently cause disappointment when transplanted to drier soils in hotter climates. For New England, English or French grown roses are much to be preferred.

We see in these nurseries many plants which are not hardy enough to survive our winters; such as *Araucaria imbricata*, *Aucuba Japonica*, variegated hollies, and golden thuja, for which there is a large demand, chiefly from England.

The visitor to Boskoop, if going from Haarlem, will find it most convenient to make the journey by steamer in the great canal, which is really the highway, lined on each side with interesting and picturesque scenery such as is found only in Holland.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 22, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE in the chair.

The following lecture was delivered :

ORIGINATING NEW VEGETABLES.

By Hon. AARON LOW, Hingham.

Mr. President, and Members of the Massachusetts Horticultural Society: In coming before you today to speak upon the subject of Vegetables, their Originating and Manner of Improvement, and the Varieties best adapted for General Cultivation, I am aware of the great importance of the subject to the farming community, and to every one who plants a garden. I do not presume to be authority on strictly scientific methods of procedure, but will give a brief history of my own experience and practice for the past forty years.

I shall take it for granted that you wish the subject treated in a plain and practical manner, so that every one present can apply the suggestions and ideas advanced to his own operations on the farm or in the garden.

All discussions before agricultural or horticultural meetings should have this aim in view, so to present the subject as to enable each member to acquire and apply the knowledge thus presented, to better methods of culture, in the use of all labor saving implements, and in planting such varieties of vegetables as shall give larger and better products, quicker sales, and thus an increased profit on his labor.

Every market gardener often notices a variation among vegetables of apparently the same variety.

One of the first principles of Nature is reproduction, and the production of new varieties by cross-fertilization or hybridization.

The improved varieties introduced during the last twenty years have been obtained by these two methods. But the searchers after new varieties should bear in mind that a sport which appears to be an entirely distinct variety will require years of careful and intelligent training to establish its points of variation and excellence.

In training to establish a cross as a distinct variety we should have in our mind an ideal as to form and the other more prominent characteristics we desire our new variety to attain, and selecting samples that come nearest to the desired points, for seed stock, persistently follow on that line until our object is accomplished.

New varieties, although apparently well established, are apt to sport back to one or the other of the original kinds from which the cross was obtained, and require careful watching for years to eliminate such points as appear undesirable.

As every year brings forward new kinds of vegetables, the up-to-date market gardener must keep himself well posted as to the merits of such varieties, and their adaptability to his requirements.

Although there are new kinds brought out which are no better than old and well-tried kinds, still among the new claimants for public favor we often find varieties with decided improvements on those previously known.

As a general farm product there is no one of more importance than the Potato. I would first call your attention to it. The early history of the potato is involved in obscurity. It was introduced into Europe at about the end of the sixteenth century. But it was a long time before it was much used as an article of food by the masses; and it was even as late as the commencement of the eighteenth century that it was pronounced by a College of Physicians in France to be poisonous and unfit for human food.

It seems strange to us that it should have taken so long to discover its merits as an article of food, when at the present time it is deemed indispensable for daily use upon the tables of rich and poor alike.

In speaking of the potato and its cultivation as usually performed we should infer that the potato itself was the natural seed, but such is not the fact. We propagate it by slips of the tubers, as we do other tuberous-rooted plants. But if we wish to produce a new variety we must take the natural seed balls.

It is a well-known fact that the varieties of potatoes now in cultivation very seldom produce the natural seed balls.

Those of us who remember the old Merino or Long Red potato, cultivated some forty or more years ago, know that, while it was

immensely productive in tubers, it was equally so in its crop of seed balls. Whether the long continued cultivation of the potato by divisions or slips of the tubers has suppressed the natural tendency to perfect its seed, or whether this effect is due to other causes, we are unable to say.

If we wish to produce new varieties we must plant the kinds of potatoes that usually produce the natural seed. The seed balls should be gathered when ripe, seed cleaned from the pulp, dried, and preserved till spring; then planted in a bed prepared for that purpose, giving close and careful cultivation, and their further development awaited.

The first year the plants are not usually very strong, and the result of our labor is a crop of rather poor looking little potatoes, from the size of a pea to an inch in diameter. The second year the seedlings increase in size and development, and we find a great variety in form and color. It usually takes from three to five years to develop seedling potatoes so as to be able to decide as to their merits.

The introduction of the Early Rose marked a new era in the cultivation of the potato, that variety proving superior to every other previously known, not only in quality, but in earliness and productiveness. Its introduction has been of great importance to the country, both as to its perfect adaptation to all sections and the large increase of wealth its cultivation has brought to the people. Its great success as an early potato induced many growers to attempt to produce new kinds from it that would surpass the original.

As the tendency of potatoes after a few years of cultivation is to deteriorate, it becomes necessary to have new varieties to take their places. Most of the kinds cultivated twenty years ago are now superseded by varieties of recent introduction. In the last half-dozen years we have had a number of new varieties of superior excellence in all of the qualities of first-class table potatoes. As most desirable of late introductions may be named the New Queen, Early Essex, Carman No. 1, Carman No. 3, Banner, Somerset, and Enormous.

From the experience of the past few years it seems indispensable to have our crop of potatoes planted very early in the season, so as to have them well advanced in growth to escape the ravages of the potato beetle, and the blight which usually appears in the

latter part of July or during August, and is apt to be followed by more or less rotting of the potatoes. Two important advantages in the early crop are that the price of potatoes is much higher than later in the season, and the land can be used for a second crop of celery or late cabbages with but little cost of cultivation, thus adding quite an amount to the yearly profits.

Another method I have practised very satisfactorily is to plant about the fifteenth of June every third row with squashes ten feet apart in the row. The potatoes being harvested early, the squashes will occupy the land later, and produce about as large a yield as if no other crop had preceded them.

In connection with the cultivation of the potato the past season, I have tried experiments in preventing scab on the tubers and blight on the vines. One of the most highly recommended methods to prevent scab is soaking the seed potatoes in a solution of corrosive sublimate according to the formula of the Experiment Station at Amherst. Another preventive is flour of sulphur, scattered in the rows when planting the potatoes. I could not see any perceptible difference in the results of either method, as the potatoes in both cases were free from the scab, while where neither was applied many of them were scabby.

In making an application of the Bordeaux mixture to the vines to prevent blight it is important that rain should not follow at least under twenty-four hours, as it will wash off the mixture before the desired effect is accomplished. In the three applications I made the past season rain followed within a few hours each time, and thus destroyed much of the effect of the mixture. Under favorable conditions I think the mixture would materially check the blight.

For a number of years much interest has been manifested in growing potatoes with commercial fertilizers. My experience has fully convinced me that the same amount of money expended for some reliable fertilizer, and applied in competition with stable manure, will give much better results in good-sized smooth potatoes, and, I think, of better quality.

Quite an important consideration is the small expense of applying a single ton of fertilizer to an acre, as compared with the cost of applying eight or ten cords of manure.

As a vegetable second in importance to the potato we may reckon the Cabbage.

In the vicinity of large markets a crop of early cabbages is one of the most profitable grown, as the demand is large and prices high.

New varieties can readily be produced by cross-fertilization, either by transferring the pollen from one kind to the other by a camel's-hair brush, or setting two kinds side by side, when the bees or the wind will make many crosses, by carrying the pollen from one to the other. Varieties can be greatly improved by careful selection of the best type of heads for seed, and continuing thus for a number of years you will find much improvement on the original variety.

For two or three years past there has been sold in the spring in the markets of New York, Philadelphia, and Chicago a variety of cabbage imported from Europe, and bringing a much higher price than any kinds of American growth.

Last spring I was pleased to receive from a seed grower in Europe a package of a number of kinds of European cabbage seed for trial. Starting the seed under glass, for medium early, I set out a piece of the different varieties for trial.

On their maturing I found two of the varieties to be extremely solid and hard, and to weigh a third more to a barrel than our best American cabbages, and to keep longer without bursting or decaying than our best kinds. The two varieties which proved the best are catalogued by European seedsmen as Amager and Solid Emperor.

An experiment conducted the past season in growing cabbages in a method rather different from that usually practised proved so satisfactory that I will briefly give the method employed. Having a piece of light loam land with a crop of winter rye standing upon it, from two to three feet high, I ploughed it seven or eight inches deep, burying the rye entirely out of sight.

The piece was well harrowed and furrowed in rows three feet apart on the thirty-first of May. Blood, bone, and potash fertilizer was scattered in the rows, at the rate of half a ton to the acre. The fertilizer was well mixed with the soil before setting out the plants on the first of June.

The plants started nicely, and grew rapidly; evidently the decomposing rye beneath was a very important help to them. The piece was cultivated twice, and once hand-hoed. The varieties grown were Perfection Red, Succession, All Seasons, and Stone-

Mason, with one hundred plants in each row. The entire piece seemed to be free from all destructive insects, as every plant grew undisturbed by any injury whatever, and every one made a large, solid head.

In all the years which I have grown cabbages I have never seen a piece having as uniform a lot of large, solid heads as this, and certainly it is strong proof of the benefit of ploughing under green crops, especially on lands long cultivated, and to me was conclusive evidence of its utility.

The above-mentioned land has been cultivated continuously since 1892, and during that time has not had any stable manure used upon it.

Perhaps I might state here that blood, bone, and potash seems to be a special fertilizer for growing cabbages. Although they did well on other fields, the above piece was far the best, which could only be accounted for by the decaying vegetable matter beneath, in addition to the fertilizer applied.

Among the luxuries of the olden time in the songs and verses of the poet were often depicted in glowing colors the merits of the golden pumpkin pie.

Since the innovations which modern customs and usages have made in the practices of that far away period of our ancestors, the Squash has succeeded to the honor sung of that old time favorite. At the present time every market gardener needs to plant quite a piece of early and late squashes to supply the daily demand of his customers.

Without doubt the best variety for early planting is the Marrow. Of the various strains of that valuable kind the Boston Marrow and Dunlap's Prolific are the best. The latter is of recent introduction, a very early variety, of fine color and quality, and immensely productive.

In passing over a field of American Turban squashes, in 1879, I found a vine with a number of nice, handsome squashes so decidedly different in appearance from the rest of the field that I stopped to examine them.

I decided from their form, varied color, and hardness of shell that they were a cross between the Turbans and Hubbards growing in a field near by. All of the squashes on this original vine, three in number, were of equal size, weighing about ten pounds each, and all growing on the vine within the length of four feet.

The three squashes seemed to partake about equally of the Turban and Hubbard characteristics. They retained the form of the Turban, and mostly its color, with the hard shell of the Hubbard. The blossom end was colored like the Hubbard, and stripes of the same color radiated to the stem. I decided that if I could train this cross to retain the hard shell, delicious flavor, and sweetness of the Hubbard, and the form and golden color of the Turban, it would be a decided novelty and a valuable acquisition. It was some three or four years before I succeeded in fixing permanently the above desired qualities. The rapid dissemination of the Essex Hybrid squash, after its first introduction, and the continued increase of popularity which it has attained, have fully sustained the high claims which were made for it on its first appearance.

As I have before remarked, it is a well-known fact that almost all crosses of vegetables are very apt to sport back to one of the varieties from which they were derived. I have every reason to believe that my last introduction, the Bay State squash, was simply a sport backward, so to speak, showing a stronger and more marked development of its Hubbard parentage. The fact that not a single Hubbard squash had been grown in the vicinity for a number of years tends to corroborate the above view. When first found it was growing in a field of pure Essex Hybrid squashes. Three very even sized squashes of about ten pounds' weight each were growing upon a single vine within the space of three feet. It is a singular fact that the original vine of both the Essex Hybrid and Bay State had each three squashes growing on the vine within the length of three or four feet, and almost identical in form and size, the only apparent variation being the color. The color of the Bay State was distinct from every other squash then known, being a blue shade with a peculiar greenish tinge. Another point that seems strongly to sustain the foregoing theory is this: no matter how careful and particular you may be in selecting your Bay State colored squashes for seed, you will find more or less sporting back to the Essex Hybrid in color, but the same shape always retained. The prominent points of the Bay State are these: earliness and quick maturity, great productiveness, good keeping, and first-class quality.

As a late winter squash the Hubbard takes the front rank. It is a later variety than either of those noted, and should be planted as early as possible after the season is warm. This choice variety

was introduced many years ago by Mr. Gregory, of Marblehead.

Three years ago I found in my Boston Marrow squashes a peculiar sport — a squash having marked characteristics of the Boston Marrow at the stem and terminal point, and the singular wrinkled markings only to be seen on that variety. The color of this sport is a dull green, unlike any other I ever grew. I have grown it for two seasons, and find it to be of excellent quality, fine grained, and very sweet. In its sporting for the two seasons I have grown it, it has shown only its Marrow parentage. In the coming season I am in hopes to establish it as a distinct and valuable variety.

I do not think that in the entire list of cultivated vegetables there is another so hard to preserve in purity as the squash family.

From the peculiar formation of the blossoms of this family of plants they are not as readily fertilized by the wind as are many others. But to remedy this defect Nature has furnished another way, by means of the bees that are continually passing from one blossom to another, the fine pollen dust adhering to their legs and bodies, and being thus carried from one field to another quite distant. Therefore, although we may isolate fields of squashes as far from other fields as possible, we are not sure but we may have more or less of this cross-fertilization by the bees, and the very means by which Nature insures the perfect fertilization of the blossoms may be the chief cause of the sports and crosses so common in squash culture, and by which new varieties can be multiplied at will.

During the summer and early fall there is quite a large demand in the market for Melons, and on land adapted to grow good melons they are often very profitable.

To grow melons to perfection requires a warm, rich soil, with plenty of nitrogenous manure, to give the vines a strong, vigorous growth. To have melons early in the season the seed should be started under glass in pots or small plant boxes made for that purpose and transplanted from them to the open ground in June. A hot, dry season is better adapted to produce melons of good quality than a season like that of 1897. The past season was particularly unfavorable for the melon crop both as to quality and amount. On an experimental piece of Improved Orange

Christiana, where a fair crop would have been one hundred boxes, but fifty were produced. One gardener who put out eight thousand hills, started under glass, had a complete failure, not selling a single box.

A few years ago I planted half an acre of Early Christiana melons on the eighth of June, following a crop of spinach. A special vine fertilizer was used in the hill. From the half acre we picked two hundred boxes and sold them at an average price of $1.25 a box. The season was hot and dry, a favorable one for melons.

Of the different varieties Extra Early Hackensack, Montreal Nutmeg, and Arlington Nutmeg of the green fleshed, and Improved Christiana, Emerald Gem, Shumway's Giant, and Tip Top of the salmon fleshed kinds, are the most desirable.

In some markets the green fleshed melons are most in demand, but the salmon fleshed are considered the best flavored.

I have no doubt that it is within the memory of many of those present when the Tomato was introduced as an article of food. It was used at first as an ornamental plant in the garden, from the beauty of its bright red fruit, and was called "Love Apple."

At its first appearance its fruit was rough and ill-shaped, and but a small portion was fit for market. It soon became more widely known, and was called for to use in various ways upon the table.

Its cultivation increased rapidly, and the demand for seed infused into the heart of every seedsman a desire to improve the varieties then known, by bringing out new ones as improvements on the few kinds then cultivated.

There soon appeared many new tomatoes, said by the introducers to be superior in earliness, smoother and better in shape, more solid in flesh, and of finer flavor and quality than any kind previously known. Among them were a number of decided superiority in all of the points of a first-class table tomato.

One of the first improved large tomatoes was the Trophy. This was a very large, solid fleshed, red tomato, of excellent quality, but not coloring well around the stem. In 1860 the Essex Smooth Round tomato was brought out. This variety is of medium size, bright red color, always smooth and handsome, and is at the present time one of the best forcing tomatoes known. In 1870 the Paragon was introduced, and has proved an excellent tomato.

In 1874 I produced the Essex Hybrid, the first large purple tomato known. This was a cross between the Essex Smooth Round and Lester's Perfected tomato. After proving this variety for three years, and finding it to be first class in every respect, I introduced it to the public in 1878.

It has proved wherever grown to be one of the best and most profitable tomatoes in cultivation.

In 1875 the Acme was introduced by Livingston. This is a smooth purple tomato, of good quality, but inclined to spot with black rot on the fruit. Livingston brought out successively the Perfection in 1880, Beauty in '86, Stone in '91, Royal Red in '92, Buckeye State and Dwarf Aristocrat in '93. All of the above are excellent varieties. The Stone is a large late tomato, handsome in shape and color, of first quality, and one of the best varieties known.

Dwarf Aristocrat is of a different class — one of the dwarf varieties, having a stout upright vine, and can be set nearer together than the larger growing vines. The tomatoes are of a bright glossy red color, early, of good size and shape, and of fine quality. I shall place this as one of the best.

In 1892 I had the honor of bringing out a new early tomato, the Comrade. The experience of many prominent gardeners in different parts of the country has proved this to be the most profitable early tomato grown. The fruit is of good size and shape, of bright red color and fine quality, and remarkably free from the black rot, a serious trouble with many early varieties.

I have another late variety which I originated a number of years ago, the G. A. R. tomato. This is a very large, round variety, remarkably solid in flesh, of a bright glossy red color, and of exceedingly fine quality. In my experimental plot of some thirty odd varieties this was the most uniform in size and shape of any. As a late tomato there is no other variety which will produce as large a yield of first-class tomatoes as this.

A few years ago a new tomato was introduced by a seedsman in Philadelphia as the earliest, largest, most productive, and handsomest tomato known, and far superior to every other variety in cultivation. In thoroughly testing this tomato, the New Imperial, for two years I find it not as early as represented, but in many respects all that was claimed for it.

There are many other tomatoes of merit cultivated in various

parts of the country, but to the market gardener the above specified varieties are as good a selection as can be made, as he can choose from them either the bright red or the purple varieties, as the fancy of his customers may call for them.

Within the last few years there has developed in a number of sections of this country a disease or blight which appears upon the tomato vines, and which I fear may prove a serious trouble.

After its first appearance in July it spread so rapidly that it ruined many vines, and greatly damaged the crop.

From the experience of the past season I think we shall be obliged to take measures to prevent the blight on our tomato vines in the same manner that we do on our potatoes.

As I usually grow tomatoes largely I shall take the precaution, the coming season, to spray with the Bordeaux mixture, before the blight makes its appearance, trusting to a thorough application to prevent its getting a foothold. Still I am fearful that the easy cultivation of the tomato has passed by, and that in the future we shall be obliged to watch our tomato fields as sharply as any crop we grow.

The tomato can be improved by two methods. If new varieties are desired, then by cross-fertilization, and planting the seed thus fertilized, and from its product selecting the best types of the qualities desired. Training those for a number of years, you can establish new varieties.

The other method is by selecting the most perfect fruit for a number of years, following on that line persistently, until your object is accomplished.

In this manner new varieties can be produced from all classes of vegetables, simply by following the laws which Nature has made to attain given results. There is a peculiar fascination in the evolvement from the multiplicity of Nature's crosses of a new variety, and the establishing of such, with fixed and permanent qualities, thereby adding another kind to the food products of the world.

One of the most important crops produced in this country is Indian Corn. In all the species of grain or vegetables cultivated there is none more interesting in its manner of growth than this. In the manner of producing its crop this plant is unlike most others, having two distinct flowers, male and female, on the same stem.

The male flowers are in a panicle on the top called the tassel, and the female flowers in a spike on the stalk below, called the ear. The silk consists of the pistils of the female flowers.

When the tassel is in blossom the pollen dust falling on the silk of the ear is transmitted by a tiny thread of silk to each and every kernel on the ear. If not thus transmitted the kernel is abortive, and fails to mature.

A very interesting experiment to demonstrate the method which Nature takes to produce new varieties by cross-fertilization can be readily made by any one by planting two rows of sweet corn, of two different kinds, beside each other. To have the result more distinctly shown, plant one row of the black Mexican variety and the other of a white variety, such as the Crosby, coming into tassel at the same time.

On ripening, you will find the ears of the black variety with kernels of the white corn, and the white ears with kernels of the black; also some kernels apparently partaking of a mixture of both.

This experiment will show how unerringly Nature's laws act to produce given results, and that with all varieties of vegetables this wonderful process of reproduction is continually evolving new forms and varieties before unknown. Where the pollen of one variety falls on the silk of the other, the kernel connected with that silk will be changed by cross-fertilization.

If any one desires to attempt to produce new varieties let him study into the methods which Nature takes to perform her wondrous works, and the better he can understand the working of her unchanging laws, and infuse into his own soul the inspiration of that wondrous life that lives on every hand, the more will his success be assured, and the more complete his triumph.

Discussion.

The Chairman said that he considered the subject of originating new varieties of vegetables a very important one, and spoke of where the new varieties come from. He thought Middlesex County farmers considered that most of the new sorts had come from there. He took pride and pleasure in the large number which had come from Essex County. The first Marrow squashes brought into the Boston market grew in Swampscott, from seed

raised by his father. The Hubbard squash was found in the garden of Old Mother Hubbard, in Marblehead, and introduced by J. J. H. Gregory. The standard variety of cabbage known as the Mason also came from Marblehead; it was improved by a neighbor of Mr. Mason's, and then called the Stone-Mason cabbage. The Danvers onion was perfected by David Buxton, of Danvers, now Peabody. The Danvers carrot was grown by Nathan Bushby, of the same place. The Marblehead corn was introduced by J. J. H. Gregory; it is very early and unfit for eating, but will do to sell. The Crosby corn was originated in Marblehead, by Mr. Wyman (who moved to Cambridge) and perfected by the late Josiah Crosby at Arlington. Many other varieties have come from Essex County. It is an honor to the county to have developed standard varieties of vegetables which are the leading kinds in the country. Among other varieties from the vicinity of Boston is Fottler's early cabbage. At one time the seed of this variety literally brought its weight in gold. Its origin is somewhat doubtful.

Mr. Low said that onions are different from other vegetables; all are improved by selection of old sorts rather than by new ones from seed. Mr. Buxton has increased the depth and measuring capacity of the Danvers onion, retaining the quality. A friend sent the speaker eighty beans, the handsomest he ever saw; they were all marked alike, and he planted them in a cold frame; the result was more than twenty distinct sorts, so he gave up attempting to improve the variety. They had been cross-fertilized, and could not be trained to a fixed variety without years of work. Potatoes are improved by selection.

Rev. Calvin Terry said that when a boy he planted potato seed, and got potatoes which were the same as the parent; afterwards they changed and he thought that they mixed in the ground. He asked whether potatoes mix through the seed alone or through the tuber.

Mr. Low did not think that they mixed in the tuber; the seed might have been influenced the year before. There is no mixture except through the flowers. The potatoes we grow now seldom flower well, and we are not likely to have seed balls. It is not in accordance with nature that potatoes should mix in the tuber.

Samuel H. Warren asked: Why not as well as corn the first year?

Mr. Low said that the corn kernel is the seed; the potato tuber is not. The squash will not change the first year, but will become more developed than either parent. Corn develops seed the first year. You might plant some of the white kernels which were on the Mexican Black ear when crossed with the Crosby as suggested in the lecture, and the result would show a great variety, easily seen, as the colors can be distinguished.

Varnum Frost questioned whether these crosses had improved the eating qualities of the squashes, and spoke of the poor quality of the Marrow and Hubbard squashes of today.

The Chairman said that the Boston Marrow does not compare in quality with the original, which was smaller, seldom weighing over eight pounds. The Boston Marrow now grown, being larger, gives a better crop in weight, but not in quality. It is sold by the ton, and that is why they have deteriorated. The old-fashioned Marrow is just as good now as it ever was. The Danvers onion is not of the first quality, as the two outer layers are thick and tough and unfit to eat. The smaller ones do very well. It is a good onion to sell. The Cracker onion is much superior in quality. It is tender and delicious, but too delicate for transportation.

Joshua C. Stone did not want people to go away thinking that every good vegetable originated in Essex County. The hybrids have ruined the market. In old times a man would buy a barrel of squashes and carry them home and eat them.

George D. Moore thought that the growing and fertilizing have a good deal to do with the quality of squashes: we cannot grow good ones in old gardens; you want new sward land to get them of good quality.

Mr. Low said that nitrogenous manures produce great quantities of vine, but squashes of poor quality. Squashes are grown today not so much for quality as to get good crops to put on the market. The poor quality is due to the cross-fertilization; different varieties of squashes grow side by side, and the variety deteriorates.

Mr. Frost said that Livingston has sent out too many varieties of tomatoes. You can take a dozen of his varieties and mix them together and then you cannot pick them out. He asked why this was.

Mr. Low replied that he did not know whether you could elimi-

nate this undesirable quality that has been brought out or not. Of two white potatoes no difference in growth can be seen until flowers appear. In one the flowers are white, in the other purple; the tubers are both white. In tomatoes a casual observer might see no difference, but a difference may be distinguished in the calyx, etc.

O. B. Hadwen asked whether squashes can be improved by thinning. They are now almost unfit for eating, owing to the inferior quality.

Mr. Low was inclined to the opinion that the quantity of the fruit would be increased, but the quality would not be improved. Eliminating too much moisture would probably do that. In a dry season the crop of melons is small, but the quality is much better thre in a wet season.

Mr. Warren thought he had gained a point in the discussion. He had planted seed from the second crop of Enhance strawberry, a late variety. To his great surprise the new seedling was to all appearance the same as the parent. He accounted for it by there being no other kind near.

Mr. Low said that you must have some other variety in pollen at the same time. There were no other strawberries in bloom. Potatoes will vary if not cross-fertilized, but if you wish to fix any particular point you must fertilize with pollen of the variety possessing that quality.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 29, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding.

The following lecture was delivered:

NUTS AND NUT CULTURE.

By FRANK M. BARTRAM, Parry, N.J.

In 1897 the United States imported over $2,200,000 worth of nuts. When we consider that most of this expenditure was for kinds that may be easily and abundantly raised within our own borders it does not speak well for our boasted enterprise. It seems incongruous to say so much of opening up and fostering markets

abroad for the agricultural products of the United States when we ignore the expenditure of our own people going to foreign purses. It is the varieties of nuts that enter most largely into United States commerce and consumption that we will consider here — those whose culture has already become a reality in some part of the country. The industry is comparatively young. It is scarcely thirty years since nut culture has assumed commercial importance. The Almond and Persian Walnut in California, and the Pecan in the South, are in the advance of the movement. Much interest is being taken in Chestnuts throughout the Atlantic States.

The claims of desirability of nut culture, beside the enticing profits, are numerous. The doctor and the lawyer depend for their livelihood upon the misfortunes of others, while the nut culturist is ever happy in contemplating the joy and good will attending the use of his product. Trucking requires ground of great fertility, and suitable for high culture; nut trees are not fastidious, and hillsides are often their home. Truck must be planted annually, while a nut orchard might almost sing with Tennyson's brook, "Men may come and men may go, but I go on forever." Nuts are not perishable; they may be stored and marketed at one's pleasure or need. They are a concentrated product, the freight charges on which are much less in proportion than on more bulky products. Not requiring constant and detailed attention, they will appeal to the large planter; while on the other hand these virtues will suggest nut culture as a side issue, for on many farms land is found, now unremunerative, admirably suited to nut trees, especially hillsides, and here the forester's attention will be arrested.

In the first place we are aware of the benefits of forests, principally in moderating extremes of flood and drought. Many kinds of nut trees are adapted to forestry planting, and their timber is highly esteemed; for instance the oak, beech, chestnut, hickory, and walnut, and even the hazel bush finds a place as a pioneer in soils too barren for other trees, and by rapidly adding organic matter in the abundant crop of leaves prepares the way for the more valuable timber trees. In a monograph on forestry prepared at the request of the Governor of Pennsylvania a few years ago, every deciduous tree named is a nut bearer. And forestry should commend itself to owners of the many hillsides in which New

England abounds, so well adapted to this, while so poorly suited to many branches of agriculture.

The ornamental value of certain nut trees is so very far beyond question that thoughtlessness and custom alone must be held responsible for depriving us of so much possible enjoyment of beautiful trees. I know I am treading on dangerous ground even to intimate anything disparagingly of the elm to New Englanders, but when in Boston last summer the contrast in the appearance of the foliage between the elm and the beech was not to the discredit of the latter. The elm has ever belonged to that class of trees that bears "nothing but leaves, nothing but leaves," and the imported beetle is vigorously attacking even this glory.

Large and spacious grounds about a home are in sad minority. The area is limited that surrounds the vast majority of homes, and the suburban home for the man of moderate means is now anxiously sought for and frequently acquired. He wishes to adorn his surroundings with choice trees, and if he will plant a chestnut or hickory (or, where they will thrive, a Persian walnut or pecan) he will have a tree of whose appearance he may be justly proud, and whose fruit will be a source of continual pleasure to young and old. In parts of France the chestnut trees about the home furnish much of the food for the family, and the surplus is sold.

The Cocoa nut is the fruit of a stately palm, growing to a hundred feet in height, and a foot in diameter, unbranched. The leaves are at the top only, in a whorl; each composite leaf is from fifteen to twenty feet long and three feet broad. From the axils of these spring the spikes of blossoms, which come in succession, so that at any time the tree has fruit in all stages of development. Some trees are claimed to bear as many as three hundred nuts a year. The area suitable to its successful culture in America is small, confined to parts of Florida.

The Hazel is another common nut not yet submitting kindly to American culture. The Puget Sound region is the most promising locality. The hazel is subject to a blight; and the lack of simultaneous blooming of staminate and pistillate flowers and lack of pollen induce some to get branches of wild varieties to tie in bushes at home, or to plant a wild bush in a cultivated orchard.

The Indians of the Southwest use the nuts of a species of pine

as food or for a relish. Roasted like peanuts they are said to be delicious.

The Leechee nut has a round rough brown casing over an edible pulp. This is whitish, but becomes brown when the nut is kept for some time. In the centre is a single seed. The fruit is very popular in the Orient and may now be procured here. It is called also the Chinese nut. Trees of it are growing in Florida and California.[1]

The Ginkgo, or Maiden Hair tree, from Japan, is of upright, very narrow growth; as an ornamental tree it is of a high order. It is hardy at Boston and free from insect pests. The nut is of inferior quality, but is sometimes used for food when roasted. The outside fleshy covering is very acrid.

Foremost in acreage, value, and ease of bud propagation among American grown nuts stands the Almond, and American grown almonds are foremost in the world as regards flavor. California is the main field of production. In 1896 her product was 912,300 pounds. The almond is closely related to the peach; in fact the hard shell variety bears too close a resemblance to a peach pit to be of pomological value except as grown for pharmaceutical purposes, or the tree may be used as a stock upon which to bud peaches, as it is exempt from attacks of the borer. The Soft Shell almond has not proved a commercial success outside of California, except perhaps in parts of New Mexico, not being hardy in the North and the blossoms being injured by frost in the South. The trees are budded upon the peach in the same way as peaches are budded, and treated in much the same way, being set at about the same age and at about the same distance apart. The almond comes early into bearing, reaching full bearing age at from six to seven years. Reports of average yields vary from five to thirty pounds per tree. Harvesting is often accomplished by spreading canvas on the ground and shaking the tree. After the removal of any parts of the hulls adhering when the nut is gathered, the nuts are dried, and sometimes bleached, and are then ready for market.

Next to the almond in acreage and value among nut crops in this country stands the Persian Walnut. Its origin is in Persia,

[1] Fruit of the Leechee or Litchi (*Nephelium Litchi*) was exhibited by Charles Amory, of Boston, at the Rose and Strawberry Exhibition of the Massachusetts Horticultural Society, June 26, 1883. It was raised by Mr. Amory at Sanford, Florida. — ED.

the home of the almond and peach. Carried to Europe by the Greeks, it was passed to the Romans, who carried it to England, where it was named walnut, signifying foreign nut, while in America it has been called English walnut, though the more appropriate appellation "Persian" walnut is becoming more common. In California alone has this nut been cultivated upon a profitable scale in America. The largest reported orchard is of 700 acres, and the crop in 1896 sold for $139,360.

The rich moist valleys of Southern California, with steady supplies of water, have claimed a monopoly of suitable environment, but by the selection of varieties whose buds start late in the spring the area of profitable planting has been increased. Most of the orchards are yet of seedlings, planted from forty to fifty feet apart. These begin profitable bearing at nine or ten years, and no one knows how long they continue so. A tree is reported from France three hundred years old, yielding now fifteen bushels at a crop. No spraying, worming, or fumigating is yet necessary, and very little pruning is done; but walnut orchards are like all others in rewarding their owners for good tillage. In the early fall all brush and litter are cleared off the ground preparatory to harvesting. We have been told of a European practice of thrashing the trees with fishing poles as not only common but extolled as a means of inducing the setting of more fruit buds. This method is not generally followed in California. Gangs are started out to pick up the nuts when they have begun to fall, usually going over the orchards four or five times at intervals of a week. The nuts, after the hulls are entirely removed (sometimes portions of the hulls remain on the falling nuts), are spread on trays for drying, being frequently stirred to prevent heating. In about three days they are ready to be marketed in the usual one-hundred-and-twenty-pound sack. Some growers kiln dry their product. Much care is necessary in curing, as nuts improperly cured soon become rancid. Sometimes sulphur fumes are resorted to for bleaching. The nuts are usually graded, and in France much inferior material is consigned to the oil mill, where a superior culinary product is obtained. There are several names that distinguish strains rather than precise types, as propagation has thus far usually been by seed. Many of these are of French origin, among which we might mention the Chaberte nut, rather small, rich in oil; the tree is not so fastidious as regards fertility

of soil as some others. The Ford, with a very soft shell, and a good keeper. The Franquette, of good size, kernel plump and choice, late in starting growth, hardy. The Gant or Bijou, shell very large, — unnecessarily so for the size of the kernel, — so called on account of the shells being used for handkerchief or jewel cases. The Kaghazi, with a very thin shell, late in budding out in spring, and an early bearer. The Mayette, the choicest of its class, bringing the highest price in the market, having large, plump kernels; late in starting out. The Mission, medium in size and thickness of shell; it has been largely planted, but is likely to be superseded on account of its early budding out, lack of simultaneous blooming of male and female flowers, and slowness in ripening up its wood in the fall. Præparturiens, very precocious and productive; rather dwarfish; its nuts possess signal advantages over the last named in every way. Santa Barbara; so thin is the shell of this variety that some damage is done in shipment; it is about ten days later in budding out than the Mission, an early and regular bearer and moderate grower; hence it may be planted closer than Mayette, Parisienne, and others.

There might be mentioned here the Chili walnut, a name applied to nuts received from South America late in winter; kernel plump, quality good, much like the kinds just named, except that very frequently the shell is in three divisions instead of the usual two of European strains.

Outside of California the Persian walnut is very rare, except along the Atlantic coast, between New Jersey and Carolina. It may be found as far north as Massachusetts. In Florida the roots are attacked by the worm that so destructively causes root knot on fruit trees there. This might be overcome by grafting on the black walnut. In the East the Persian walnut may not become a profitable orchard tree, but its stateliness, beauty, and freedom from disease and insect pests, heartily commend it as an ornamental tree, and its product will be much enjoyed at home. Disappointment has often resulted on account of the deficiency of pollen and the lack of simultaneous blooming of the pistillate and staminate flowers. A remedy for this will be found in planting together suitable varieties.

There is a native California thick shelled walnut used there for stocks upon which the Persians are grafted for the purpose of dwarfing them and hastening fruiting. The Pacific coast Black

Walnut is very precocious in Philadelphia, where an eight-foot tree bore fifty nuts, but it has no other merit. The American Black Walnut has been much gathered in the East for home cheer and sold in considerable quantities at from one to three dollars per bushel. The only reason for prizing these nuts that I can see is because of custom; they are common and keep well with little care. The kernel is so intricately incased in such a thick shell, admirably adapted on the outside to picking up grains of sand to mix automatically with the kernels, that these nuts will surely be superseded as soon as we get familiar with something better — improved hickories, for instance. Sound old trees furnish timber most highly esteemed, and many are urging the planting of black walnuts for this use. The rich dark color, which makes the wood so valuable, is not present in young trees, and some say does not develop until the tree is nearly a hundred years old. If one should wish to plant black walnuts for timber purposes he will probably get one or two year trees which may be quickly planted, perhaps with a crowbar, about nine feet apart each way, surrounding them with fast growing trees like Japan walnuts, red maples, or mulberries to prevent low branching. The pollen is said to be potent for Persian varieties.

The White Walnut or Butternut thrives in dryer and poorer soil than the black walnut, and further north. The nuts find also a place in confectionery, but are hard to separate from the shell, and the wood is not nearly so valuable for timber purposes as that of the black walnut. Both may be used as stocks upon which to graft the thin shelled Persian varieties. This fact will doubtless be appreciated in Florida, where these native species are free from the attacks of the worm that so damages the Persian walnuts by root knots.

Closely resembling the butternut in the appearance of the tree, more vigorous in growth and more luxuriant in foliage, are three varieties of eastern Asiatic walnuts, called Sieboldiana, Cordiformis, and Mandshurica. The last named is from China and Korea, and the nut so closely resembles the butternut that it needs no further mention. The Sieboldiana, from Japan, is smaller than the Madeira, though it looks not very unlike it. It has a thicker shell with a smaller kernel, of slightly inferior quality. The shell is much thinner than that of the black walnut; the meat is much more easily extracted, and the tree is handsomer. The Cordifor-

mis, also from Japan, is by far the most valuable of the three. The name is suggested by the pointed heart-shaped form of the nut. This is flat and smooth, and by a single tap the shell separates into halves, and the nut is readily extracted whole without being mixed with sand and bits of shell. The kernels are of good quality, and are already prized by confectioners. Like the Sieboldiana, the nuts are borne in clusters at the extremities of the previous season's growth. The trees bear very young; I have seen many clusters on trees three years from seed. Mr. Luther Burbank says they are more regular and abundant bearers than the Persians in California. Coming from the most northern parts of Japan, they would be expected to be hardy in most parts of this country, and this is confirmed by experiment. So eminent an authority as Mr. Burbank declares them to be "as hardy as an oak." They are rampant growers; on a tree three years from seed I have measured on the leader a growth of ten feet made that season in New Jersey. Long composite leaves of most luxuriant appearance, always free from disease, make the tree most desirable as a shade tree, while in winter the trees are so open as to admit the then cherished sunshine. I am persuaded that the Cordiformis is destined to become deservedly popular in America.

The Bulletin of the United States Department of Agriculture on Nut Culture says in regard to the Pecan, "With the area of special adaptation in the United States, considerably larger than is found for either the Persian walnut or almond, and with a susceptibility to improvement by selection, in size of nut, thinness of shell, and delicacy of flavor that are very encouraging to those who have attempted this work, the pecan is probably destined to become the leading nut of the American market. If its culture is pushed with the usual skill and energy of American enterprise there is reason to believe that it will not be many years before the pecan will become not only an abundant nut in our markets, but also an important article of export."

The widespread attention and energy addressed to pecan culture along the Mississippi river and its tributaries as far as Iowa and Ohio, and the salutary results obtained, are surely bearing out this observation and opinion. Florida and California hasten to tell of the successful prosecution of the industry within their borders, but it is the alluvial bottom lands along the rivers of

Louisiana, Texas, and Mississippi that are the headquarters of the pecan culture of the world, and seem destined to maintain this prestige. The pecan is entirely uninjured by a periodical overflow of the land, having even endured as much as three feet of water for a week. Near the Gulf, where the period of inundation is longer, the pecan succumbs.

The accounts of the amazing profits of pecan culture in these regions are enough to turn the head of Horace Greeley's weathercock and make the sage of Chappaqua's injunction run "Go South, young man." A Texas correspondent of "Farm and Ranch" writes: "If at the birth of a son one would plant only twenty acres of good land in pecan trees, and set it aside for him, that boy at twenty-one would have an income of $5,000 a year and merely the trouble of picking it up." The industry has been so long established that we depend not merely upon the prattle of some visionary, or the expectation of a theorist, but horticultural literature is replete with the testimony of men of unimpeached integrity as to what has been accomplished. W. R. Stuart said in an address before the Mississippi State Horticultural Society in 1891: "It is desired to refer to one tree of the variety known as the Stuart pecan, soft shell, which has yielded this year over two hundred and fifty dollars' worth of nuts at the price readily obtained for them." As early as 1871 reports came that the pecan crop was worth five times as much as the cotton crop in some sections that year. The statement is widely circulated that in 1880 San Antonio alone shipped 1,250,000 pounds of pecans, worth from four to six cents per pound on the wagons. Many orchards are of selected seedlings, but advocates of this are acknowledging that as their orchards come to bearing they are not nearly so sanguine as before. Root grafting, crown grafting, and annular budding are successfully practised to propagate to a certainty desirable varieties, several of which are named. The qualities most sought for are large size, thin shell, plump, full kernel of good flavor, and productive trees coming early into bearing. Seedling trees have usually come into profitable bearing when about ten or twelve years old, increasing for a score or more of years, and continuing proportionately long. From ten to twenty bushels are expected as an annual crop from a tree of full bearing age. A report states that a wild tree has been known to produce more than a thousand pounds in one season. Except that it

comes so frequently, and upon such good authority, I should not dare repeat the statement, that in times past, in gathering the nuts, trees have been cut down to get the nuts quickly and at once, but such vandalism and short sightedness is too absurd to be abiding. Mr. F. A. Swinden, Brownwood, Texas, who claims the largest pecan orchard, has thought of using street sweepers to collect the nuts into rows. No especial care is exercised in curing. The small nuts are fed to pigs or consigned to an oil mill. There is trade existing for the shelled kernels; one firm alone, in 1890, sold over a hundred thousand pounds of kernels in halves; they sold for from forty-five to fifty cents per pound.

Closely allied to the pecan botanically, and closely resembling it in the appearance of the tree, is the Hickory nut, or Shellbark, — too familiar to need much description. We know of the difference in size, shape, and flavor of nut, thinness of shell, and ease of extracting the kernel. Owing to the remarkably poor success heretofore attending efforts at bud propagation, I know positively of but one grafted variety offered for sale, the Hale's. The original tree of this, probably considerably over a century old, is at Ridgewood, N.J. The nut is of good size and quality, and of exceptionally thin shell. It surely is an abiding wish with me that a large measure of the success attending the culture of the pecan in the South might be visited upon her cousin in the North, and it probably will be as attention is directed toward the industry. The tree is desirable for lawn or roadside planting; the nuts are salable, and the timber valuable.

There are several reputed hybrids between the pecan and hickory nuts, the most renowned being known as the Nussbaumer Hybrid. The original tree, standing in Illinois, is about fifty feet high; the nuts that I have seen closely resemble the pecan in appearance.

From a commercial standpoint the Chestnut for this vicinity seems to me by far the most promising of nuts. We know the tree thrives and bears here, which are important factors already established. We know that a demand already exists for the product sufficient to consume not only all American chestnuts now offered, but many thousand pounds imported in addition. Ten thousand packages come annually to the port of New York alone, chiefly from Italy and France. They are mostly sold along the streets, much as peanuts are. Consider the vast increase possible

in this line! Consider the far greater demand when they become as frequently used as desserts and relishes as their merits deserve! Mark the frequency with which the chestnut appears in newer cook books for stuffings, dressings, etc., and remember that chestnuts are even now found with vegetables upon that class of American tables that soon have innumerable imitators, and prepare for this demand, which is small indeed compared with the possible and probable consumption when chestnuts are dried, ground into flour, and become the staple article of diet that they have so long been in Southern Europe. Not only chemistry, but what is of far greater practical value, the experience of generations, has demonstrated the fitness of chestnut meal for human food.

Having noted that the tree will thrive and produce here, and that the market will absorb the product, consider some of the intermediate advantages of this crop. Chestnut trees do best on high, well-drained land, with open subsoil, — hillsides, for instance, in which New England so abounds. It is no objection that land is stony; chestnuts will not bruise in falling, as plums would. Once established, a chestnut orchard continues profitable for decades or even centuries. The famous chestnut tree on Mount Etna has been bearing annual crops for more than two thousand years and bears yet. Chestnut orchards have been likened to "a government bond: you cut off a coupon each year, while the principal is undisturbed." No protection and very little pruning are required. Peach trees must be wormed twice a year; chestnut trees never. No large fertilizer bills encroach upon profits. Chestnut roots go deep down into the earth, and pump up the fertility from far below the reach of annual crops. This kind of farming is surely a pleasant method of mining, and any one with Klondike fever may be spared privations, hardships, dangers, and exertion by having chestnut roots do his digging for him, while he is at home or about other occupations. An established chestnut orchard will yield as many bushels per acre as corn, and with little more than the expense of gathering. The Albion Chestnut Company sold the first of their crop in New York at the rate of $14 per bushel for Alpha; as the season advanced prices fell rapidly to $12 and $10, and to $7 and $8 for Numbo and Paragon. If farmers should get such prices for corn they would raise nothing else, one would think; while they have ignored a crop that would yield as much, selling for many times

the amount with much less annual expense; indeed, the annual expense is in almost direct proportion to the crop, while with corn your bill necessary to fertilize and prepare the ground, procure and plant the seed, cultivate frequently, and cut and husk the crop is about as much for a poor as for a paying crop.

Chestnuts do not require the constant attention and Sunday labor connected with dairying, and Sunday confinement has started more than one boy from the farm. They do not need to be gathered at a critical moment; a delay of a day or even of a few hours, or an untimely shower, may ruin a whole crop of cherries. If it does not suit you or is raining today, perhaps it will be better tomorrow; or if you do not wish to go out, send any one. Gathering chestnuts does not require especially skilled or expensive labor. Chestnuts are not perishable, like flowers, vegetables, or milk, neither do they necessitate expensive and quick shipments and prompt sale. They may be held in storage or shipped thousands of miles to your choice of markets. Every summer I have seen the sides of turnpikes from Philadelphia lined with tomatoes, string beans, egg plants, etc., that reached the city in times of glut or for some reason were not promptly sold and became worthless. In the case of black raspberries, for instance, the grower loses not only the cost of producing and shipping, but also the boxes. Chestnuts do not need expensive packages for shipping, nor are they bulky like hay. Mr. John R. Parry sent to Philadelphia a two-horse shelving load of tomatoes; a bag of chestnuts thrown upon the seat brought more money than all the truck on the wagon.

Many are deterred from embarking in nut culture because they think they have to wait so long for returns. As Colonel Stuart said, "My dear friend, will you not have to wait anyhow?" And are not the steady and abiding profits worth waiting for? But the fact is, you do not have long to wait. Mr. J. H. Hale wrote me, under date of Dec. 12, 1896, "We have Burbank's Early in the South grafted last spring, which made a good growth until mid-season, and then was checked for a while and started on its second growth; the first growth bloomed and produced some superb nuts; we picked handfuls of them along the nursery row only a few days ago." It is no uncommon sight at Parry's nurseries in New Jersey to see fully developed chestnuts along the nursery rows on two-year grafts, and thirteen burs have been counted in

the fall on a graft set the previous spring. A six-year-old Paragon tree was literally covered with burs.

An old tree top grafted produced a bushel of nuts the second year that brought ten dollars in Philadelphia. Are there not many old seedling trees in pastures or lawns that could be thus made easily remunerative? There are large areas of land where chestnut trees have been cut for timber, and the roots have sent up suckers which may be grafted to improved varieties. The vigorous root system already established makes a fine growth, and early returns may be expected. The Albion Chestnut Company of New Jersey has begun operations of this kind with ambition ultimately to treat a thousand acres of chestnut stump land in this profitabl emanner.

Those who had no such old trees or sucker land, but who realized the promising opening in chestnut culture, have planted seedling chestnut trees of American growing, and grafted them after they have become thoroughly established. The American seedlings can be grown at home, or purchased cheaply of leading nurserymen. With proper handling they can be transplanted with as much certainty as fruit trees. The other day I walked through an orchard planted a year ago with chestnuts alternating with pears and cherries, and saw in the six-acre block but three dead chestnut trees, but more than this of cherry trees planted at the same time by the same man.

It is surprising what an influence grafting has in hastening the setting of fruit, and if this were the only advantage it would be worth the trouble. But this is not the main reason for the practice. The more attention is paid to a kind of fruit, the oftener we observe improvement in seedlings, and it is to fix and perpetuate all the improvements that bud propagation must be resorted to. The plan of planting seedling chestnut orchards vanished almost before its coming.

There are three distinct strains of chestnuts: the American, European, and Japan. The American is the tall, stately tree with which we are so familiar; the nuts are small, usually fuzzy, and of the best quality. Very few selections have been made and propagated by grafting. The European seedlings are not usually hardy here; very few imported trees live to bear, but from the seed of those that have borne here have come a very popular class of chestnuts, including Paragon, Numbo, Ridgely,

Scott, and a host of other good kinds. These trees are characterized as being intermediate between the tall American and the compact Japan: the wood is heavy, burs large, nuts good sized and of good quality. There are three kinds of chestnut in Japan, and the largest and best variety is being largely planted in America, and the choicest seedlings named and propagated by grafting. The tree is a beautiful lawn tree, of compact, symmetrical growth, not so large as the American or European; the foliage is attractive and healthy, resisting a blight that sometimes attacks the other species. The trees bear remarkably young. Luther Burbank named one of his seedlings the Eighteen Months, because it bore eighteen months from the planting of the nut. The Japans are regular and good croppers of nuts of the largest size, borne in very small burs; nuts have measured seven inches in circumference. They are not usually of the finest flavor, but the large size, attractive appearance, and earliness in season of ripening make them most profitable. They will form a perfect union when grafted on American stocks.

Of varieties now offered to the public we should choose Alpha, very early; Reliance, a heavy yielder; Kerr, remarkable for having short spines and few of them; and Parry's Giant, of the largest size. It may be that in commercial orchards some features of the traditional nutting party will be eliminated. Instead of letting the nuts fall and hide among leaves and litter, it is not uncommon to send out men with buckskin gloves to pick the burs from the tree like apples. This is done for two reasons; first to save time in hunting for the nuts, which, in rough ground with much underbrush, would be quite an item; and second, to forestall and eradicate the chestnut weevil, which sometimes proves a discouraging pest. This insect belongs to the curculio family; the adult deposits eggs in the nut as soon as it forms, and as the nut matures it incases the egg, which hatches into the familiar grub about the time the chestnut is ripe. When full grown the grub eats his way out and naturally would go into the ground to complete the cycle of his life history. In combating the insect prompt gathering cannot be too strongly emphasized, in order to prevent the development and escape of the grub, whose progeny would menace the succeeding crop.

Trees or groves in proximity to native trees whose product is left without care will be ever threatened by the weevil. Chest-

nuts, in weevil infested localities, should be dipped in hot water, subjected to a dry heat, or treated with bisulphide of carbon to kill the grub, and hastened into market.

The Chinquapin is a bush found wild in great abundance in the mountains of Virginia and Carolina. It bears a great many clusters of little burs, each containing a pretty shining little brown nut resembling a chestnut, and of superior flavor.

In conclusion let me call attention again to the timber value of nut bearing trees. I am still more anxious that their ornamental properties be remembered, and especially by the owner of a home with but limited surroundings, who feels that so much of his earnings must be sacrificed upon the altar of utility. Let him not forget that there are trees as handsome as any which will yield each year a product desirable at home or salable anywhere.

Let me commend nut culture to the farmer who would increase his income. No one need be deterred because he has no large acreage to devote to nut orchards alone. There is surely on every farm room along lanes, in pastures, or on hillsides, for a tree which, while crowding out nothing now useful, will be an enduring source of satisfaction.

Discussion.

The lecture was illustrated with specimens of nuts of many varieties, and also twigs from various sorts of nut trees.

During the lecture Jackson Dawson asked what method is used for grafting nut trees, and what proportion of the scions take.

Mr. Bartram replied that Mr. Engle would use split grafting, but he thought tongue grafting better. The proportion which takes is very misleading, sometimes from 85 to 95 per cent.

The Chairman said that there was one point about the chestnut weevil which he did not understand. If you gather the bur before the weevil hatches, does it not hatch and work in the nut after it has been gathered ?

Mr. Bartram replied that in the immature nut we find the egg of the weevil; this hatches as the nut ripens, and the weevil, after working in the nut, leaves it by making a hole in the shell, through which it escapes. If we gather the nuts early, and submit them to a hot water treatment, the weevil is killed while still in the egg.

The Chairman noted that the shagbark and chestnut were the

only nuts recommended for culture in Massachusetts. Mr. Bartram added the Japanese walnut.

The Chairman said that here in Massachusetts, where there is much useless land, we ought to grow nuts. They should be planted in orchards. Nuts and timber cannot be combined in forest growth, as the nuts will be confined to the tops of the trees. Seedling nut trees send down a tap-root very deep, which causes a good deal of difficulty in transplanting naturally grown trees. Nursery grown trees, which have been several times transplanted, do not have as long a tap-root, and can be easily handled. The speaker asked whether these trees send down a tap-root, and were thus as deep rooted as undisturbed trees.

Mr. Bartram said that they do. He had seen trees which had had their tap-root cut off for several successive seasons; they started a new one each year. Grafting is done on a piece of the root in the house, like apples, or done in the field as soon as the wood starts. The scions should be cut at this time of the year, and kept dormant by packing in sawdust in an ice house or cellar.

Rev. Calvin Terry thought that scalding would spoil chestnuts, and the flavor would be destroyed by early picking. He said that in his experience transplanted nut trees will not live. Now is the time to cut scions. He had done grafting much the same as with apple trees, but found it very difficult, and asked if there are any secret methods which we do not understand.

Mr. Bartram wished there were, and said that it is more difficult for experts to graft nuts than apples.

Joseph H. Woodford said that the nuts exhibited by Mr. Parry, of New Jersey, at the Annual Exhibition of Fruits and Vegetables of this Society last fall, were given to him. He found that one-half of them were full of worms; the good ones he sent to Kansas. Jackson Dawson has transplanted every kind of nut, and we know that nuts can be grown here. What we do want is to know how to prevent a loss of one-half of the crop after they are gathered. We must kill the insect before the eggs are laid; that is, while the tree is in blossom; success would then be sure. He asked whether there is any method of doing this.

Mr. Bartram replied that he knew of none. Hot water or dry air treatment of the nuts is the only preventive of losing the nuts after they are gathered. If you could gather up all the chestnuts in the land no new crop of insects would appear, but

this course is impossible. Native chestnuts are great breeders of this insect. Whether or not spraying will ever be applicable is a question.

The Chairman asked why the bearing of a pecan orchard of which the lecturer spoke was not satisfactory.

Mr. Bartram replied that the pecan was not satisfactory because the nuts did not all ripen up at the same time.

The Chairman asked whether that was caused by the orchard containing trees of several strains.

Mr. Bartram said that it was; it was a seedling orchard, and consequently the nuts ripened at different times and could not be gathered satisfactorily by sweeping.

The Chairman said that if they were grafted with some one variety the nuts would all ripen at the same time.

Mr. Bartram said he had recently noticed in passing through a new chestnut orchard of three hundred trees that only one per cent. had died. They were transplanted from a nursery.

Mr. Dawson had grafted all kinds of nuts, and found Hale's hickory very hard to handle. If it is easy to nurserymen, why do we not have more of them? He could not graft it successfully, but thought it the finest shellbark, if we could get it. He asked what the lecturer's experience had been with it.

Mr. Bartram said that it is one of the most stubborn nuts to graft, and hoped that we should discover some method which would succeed; until the nurserymen do we shall have to wait.

Mr. Dawson said that Mr. Fuller spoke of the stubbornness of the hickory in regard to grafting. There should be some free stock in all kinds of trees. *Carya alba* has wood that is very hard and firm. The wood of the butternut is the most free of all the nuts. If they are grown in four-inch pots and used for stocks, and the grafting done under glass, good results are obtained. There are few nuts hardy enough for commercial use. He asked why the butternut was not a commercial nut.

Mr. Bartram said that it was too hard to get at the meats, and that although it is now used in confectionery he thought we should soon have something better.

Mr. Dawson thought that butternuts improved with age, and that after two or three years from the time they were gathered the flavor was much improved. Mr. Edward S. Rand had half a dozen nuts of *Juglans Mandshurica* from Japan, from which two

trees were raised. They stand on the grounds of the Bussey Institution, and one of them has borne two bushels of good fruit. It is one of the most prolific nuts. He said that *Juglans cordiformis* and *J. Sieboldiana* are hardy here. There is a pecan at the Arnold Arboretum which is seventeen or eighteen feet high, but has never fruited; our climate will not bring them into bearing so quickly as that of New Jersey. Many other nut trees have been set out, some of them from eight to twelve years, and they are now fifteen feet high; they are just beginning to bear nuts. The Paragon chestnut is perfectly hardy here in Massachusetts. The Chinquapin is hardy and bears fruit; this might be improved and made a larger and better nut.

Robert Manning gave some account of his experiments on a small scale in nut culture. Pecan trees raised from nuts which probably grew in Texas, bought at a grocery store, proved unable to resist our winters, while trees raised from nuts grown in Princeton, Ill., had never been injured. In the same way the European chestnut, grown from nuts offered at a fair in this building, were tender, while those raised from nuts sent him by H. E. Van Deman when Chief of the Division of Pomology in the United States Department of Agriculture, which were grown at a considerable elevation, proved quite hardy. European filberts, one of whose nuts is figured in the "Report on Nut Culture in the United States," plate 13, after bearing for several years, succumbed to a fungous growth on the branches — doubtless the same as that which has destroyed many trees in Kent, the great filbert growing county of England. The outward manifestation of this fungus was in rows of small black tubercles on the branches. Plants of the native hazelnut which have fruited have thus far been entirely uninjured by this fungus. He had raised the black walnut from seed, and the trees were vigorous and hardy, but the quality of the nuts, which were what he sought, was found so inferior that the trees were cut down. A butternut tree bore nuts of excellent quality; the only drawback is that mentioned by the lecturer: the shells are so thick and hard that it is difficult to get at the kernels. All the above mentioned kinds were raised from seed. An English walnut tree, which grew large enough to bear, was killed by the severe winter of 1860–61, and later experiments had been no more successful, the trees proving tender in every instance. The speaker said he had heard that the chestnut

would not flourish near the seacoast, and asked the lecturer whether this was true.

Mr. Terry said he had never seen chestnut trees grow near the seacoast.

The Chairman could not remember any natural grown trees on the coast. He said that the Spanish chestnut was hardy, and had fruited on the grounds of O. B. Hadwen, at Worcester.

Thomas Harrison knew of a very large tree near the coast — within three or four miles; it was between ten and twenty feet in circumference.

A gentleman knew of a tree on the Hale farm in Chelsea which bore fruit.

Mr. Dawson spoke of a fungous disease on a filbert some years ago. The tree was giving good crops until the fungus came and killed it. There seems to be no cure.

Henry C. Cottle mentioned some trees on Parker Hill; there are from twenty to fifty which bear each year.

Another gentleman spoke of his experience in grafting the hickory on the pignut, as it grows in Southern Florida. The scions were cut in Connecticut, and taken South, where the grafting was done, the cleft graft being used. They grew, and some bloomed and bore nuts the second year. Those grafted on the sprouts of the shagbark were not successful. He had had no experience here in the North.

The Chairman thought that on the Treadwell farm, in Topsfield, where there have been many trees planted, a large, handsome chestnut fully a foot and a half in diameter showed the success which can be had in a cultivated tree.

Mr. Harrison asked Mr. Dawson whether there is any affinity between the filbert and the witch hazel.

Mr. Dawson said that there is no relation between them, and that they could not be grafted. He asked how soon the chestnut would bear good crops of nuts.

Mr. Bartram said in eight or ten years.

Mr. Dawson noted that in his experience the tree has to get pretty well along in years. When young only a few nuts are borne, considering the size of the trees, while on old trees nuts are borne annually.

BUSINESS MEETING.

SATURDAY, February 5, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

William C. Strong announced the decease of Edward C. R. Walker, a former Recording Secretary of the Society, and moved that a committee of three be appointed by the Chair to prepare a memorial of him. The motion was carried, and the Chair appointed as that Committee Charles H. B. Breck, Mr. Strong, and Azell C. Bowditch.

The President spoke of the desirability that the Society give more attention than hitherto to forestry and kindred interests, and after remarks by several members it was unanimously

Voted, To appoint a Special Committee on Forestry, of five members, which shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, in securing the planting of trees, and the preservation of those already planted upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may have placed at its disposal.

The President appointed the following named persons to constitute the Committee above provided for:

SPECIAL COMMITTEE ON FORESTRY.

Harvey N. Shepard, Chairman.

Nathaniel S. Shaler,	John G. Jack,
J. D. W. French,	James H. Bowditch.

The President stated that the Annual Report of the Treasurer

had been presented to the Finance Committee, who asked for further time, which was granted.

The Secretary laid before the Society a letter from Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge, acknowledging his election as a Corresponding Member of the Society, and thanking the Society therefor.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Miss Helen Sharp, of Boston.
George Abbot Morison, of Cambridge.
Charles Maynard, of North Easton.
C. S. Harrison, of Roxbury.
George Mabbett, of Plymouth.
Harvey N. Shepard, of Boston.
Nathaniel S. Shaler, of Cambridge.

The meeting was then adjourned to Saturday, March 5.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, February 12, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The following lecture was delivered:

Some New Notions about Some Old Insects.

By M. V. Slingerland, Cornell University, Ithaca, N.Y.

For many centuries the insect world has afforded one of the most fascinating of all fields for observation by those who love to commune with Nature and to read her books. Most of those who speculate upon the various phases of that mysterious something called *life* get some of their most interesting facts from the insect world. Entomology, or the science of insects, is thus an old science and has had many devotees.

What is considered as the first entomology, or the first book devoted entirely to insects, was published in England, in 1634.

It is a quaint old volume entitled "Theatrum Insectorum." The authors, Drs. Penny and Mouffett, are said to have familiarized themselves with all that had been previously written about insects, and to have added much original matter, thus making the volume a compendium of what was known of these animals previous to the seventeenth century. Hundreds of busy minds during the succeeding two centuries found recreation in watching these interesting creatures, and their recorded observations have added much to our knowledge of the insect world. It is within the past century, however, that insects came to be studied from another point of view than that of mere love of the work or for "science's sake." It was not until about the beginning of the present century that the lives and habits of insects came to be studied with a view to discovering their most vulnerable points, that man may the more easily destroy them. In short, that phase of the study of insect life which has come to be known as economic or applied entomology is scarcely a century old.

The comparative youthfulness of this phase of entomology is not due to the fact that injurious insects were previously unknown. All are familiar with the biblical accounts of insect ravages, and many similar records are scattered through the succeeding literature. But previous to the middle of the last century most of the means used for the destruction of insects were of a spiritual nature, such as incantations, excommunications, and the like. During the latter half of the eighteenth century several books were published in Europe devoted to injurious insects, and especially to methods of combating them. Most of the recommendations, however, were mere guesswork.

In America nearly everything relating to insects has been published since the Revolution. There are many articles on such well-known insect pests as the peach borer, plum curculio, canker worms, and the Hessian fly, scattered through the early horticultural and agricultural literature. For nearly twenty years Dr. Harris published articles on injurious insects in the "New England Farmer." Finally he was induced, in 1841, to bring together the results of his wide experience and study in the form of a book, which has become a classic, and well-thumbed copies are usually to be found on the table of every American student of insect life. I refer, of course, to his "Treatise on Some of the Insects of Massachusetts Injurious to Vegetation." This simply, concisely,

yet beautifully written account of what the author had seen and learned about insects justly entitles him to be called the "Father of American Economic Entomology;" and the science of modern applied entomology may very well be said to have had its birth in America with the publication of this noteworthy volume by the State of Massachusetts.

The science has since made rapid strides in America. The earlier writings were signed by such familiar names as Harris, Fitch, and Walsh, and veritable mines of information are their reports. But the addition of Paris green and kerosene emulsion, and the modern spray pump and nozzle, to the earlier insecticidal batteries, soon revolutionized recommendations regarding the destruction of our insect foes. Thus the more recent writings of such well-known entomologists as Riley, Comstock, Cook, Lintner, Forbes, Fernald, and Howard have not only added much to our knowledge of the habits of insects, but their recommendations for combating them mark a great advance in the science, so far as it concerns the horticulturist. The establishment of experiment stations in nearly every State gave a great stimulus to the scientific study of agriculture, and in no other branch has this been more marked than in economic entomology. The working corps of many of the stations now includes a trained observer of insect life, and a great mass of literature has already resulted. But much of this material has been hastily compiled, the mistakes of earlier writers being oftentimes repeated, and is thus of little value. Good compilations, seasoned with common sense, have a legitimate place in our literature. The work has grown better each year, as the observers have become more skilful, and now there are many valuable additions to our knowledge of injurious insects coming from the press monthly in the form of experiment station bulletins. There has been too much guesswork in our recommendations for fighting insects. They are too often based upon insufficient knowledge of the life-habits of the insect, or upon the conditions under which the horticulturist must fight these little foes; and they are, therefore, either useless or impracticable. Horticulturists and others are fast realizing that in order to fight their insect foes to the best advantage it is necessary to know as much as possible about them. I usually find that those who control their insect enemies most successfully are the ones that know the most about them. Inquiries from such

horticulturists have stimulated workers in entomology to study our injurious insects with renewed vigor. The result is that the so-called "remedies" now recommended are more often based upon a more scientific and rational knowledge of the insect and of the horticultural conditions. We doubtless lead the world so far as improved methods for fighting insects are concerned. Paris green is only just coming into use in England and other foreign countries. The more progressive horticulturists now realize that the science of spraying has come to stay.

Climatic and other unknown conditions often cause a considerable variation in the habit and life of an insect. The same insect may pass through but one generation in a year in one locality, while in another State. perhaps only one or two hundred miles away, it will be double-brooded. It may lay its eggs on the fruit in one State, and on the adjacent leaves in another State. Oftentimes a very successful method of fighting an injurious insect depends upon some apparently trifling habit which may easily be overlooked. Recent additions to our knowledge of that old and familiar pest, the Codling-Moth, illustrate most of the facts above mentioned.

An entomological library which would include all that has been written about the injurious insects of the United States would occupy no inconsiderable space in any one of our great university libraries, and one would need several thousands of dollars to equip such a library. It must be remembered in this connection that much that has been recorded about our insect enemies occurs in the foreign literature. For, of the seventy-three insects of prime economic importance in the United States, the species each of which almost annually causes a loss of hundreds of thousands of dollars, only thirty are native, while thirty-seven species have been introduced, with six species of doubtful origin. Of the thirty-seven introduced species, thirty have come to us from Europe, all, with one exception, the gypsy moth, as accidental importations.

When one of our students first begins to study a certain injurious insect seriously, and fairly realizes how much has already been written about it, I am often asked: "Is it possible that there is anything new to be learned about this insect?" My experience in studying the habits of insects during the past few years has led me to believe that there is much to be learned

about some of those insects that we have thought we knew all about.

The present demand from horticulturists and others is for more detailed information, and this is resulting in the publication of many more careful and exhaustive bulletins and reports upon our injurious insects. Such bulletins are the ideal toward which most economic entomologists are striving as best they may with the facilities at hand. Whenever I make an exhaustive study of any insect, in addition to watching and recording every detail of its habits, I always find it interesting and profitable to examine what others have written about it. The discovery of the first published record of the insect, and the tracing of its subsequent history through many old and musty volumes, to discover by whom and when certain facts were added to our knowledge, has a peculiar fascination for me.

If there is any one of our common insect pests, about which we have thought that there was little new to be learned, it is the codling-moth. There was scarcely any change in our stereotyped biography of this pest for half a century or more previous to the present decade. In 1878 a practical fruit grower accidentally discovered that when he sprayed his trees with Paris green, he "not only rid the orchard of canker worms, but that the apples on the sprayed part were much less eaten by codling-moths." It was soon demonstrated by many experimenters that one could kill a large percentage of the apple-worms by applying a poison spray just after the blossoms fall. While this has been demonstrated over and over again, it will be found that the explanations as to just how the worms were killed by the poison are obscure, indefinite, and vary considerably. A horticultural friend, the late Professor Lodeman, after many careful experiments, satisfied himself that often at least seventy per cent of the apples that would otherwise be ruined by the worms could be saved by spraying. But he could not see just how it was accomplished, and often appealed to me for an explanation. I confidently expected to be able easily to find the explanation in the literature, but was surprised to discover that no definite observations had been recorded upon the habits of the newly-hatched worms; and it was only quite recently that any one had even seen the eggs of the codling-moth. I was thus forced to take up the study of this familiar pest. The results of two years' observa-

tions upon it, and a critical study of its literary history, is embodied in Bulletin 142, which has just been issued from the Cornell Experiment Station. My study brought to light, not only several interesting historical facts, but it has also resulted in some new notions about the habits of the insect.

It is said that Cato speaks of "wormy apples" in his treatise on agriculture, written nearly two hundred years before the Christian era. In the first century A.D., Pliny wrote: "The fruits themselves, independently of the tree, are very much worm-eaten in some years, the apple, pear, etc., for instance." While the apple-growers of these ancient times were doubtless familiar with the work of this worm, the real history of the insect itself apparently begins in 1635, or almost with the beginning of purely entomological literature. The first account appeared in a quaint Dutch volume by Goedaerdt. Nearly a century seems to have elapsed before we find the insect again discussed by entomologists. In 1746 a German writer, Roesel, recorded a very good account of the habits and life of the insect, accompanied by some colored pictures which have not been excelled since in color. Apparently the first English account appeared in 1747, and it was rendered especially noteworthy, since the author then gave to the insect the common name, codling-moth, by which it is to-day recognized by all the English-speaking peoples.

Although the codling-moth was doubtless introduced into America as early as the middle of the last century, it seems to have been first noticed in our literature in 1819. Mr. Joseph Tufts, of Charlestown, Mass., then published an account of rearing a moth, instead of the plum curculio, which had been thought to be the sole cause of wormy apples in America. Thatcher had made the same discovery when he wrote the second edition of his "American Orchardist" in 1825. This is apparently the first notice of the insect in any horticultural book, and although Europeans had been writing of it for nearly two hundred years, it is a curious fact that, so far as I can glean from the literature, it remained for this American writer to make the first suggestion for controlling the insect; he suggested scraping the trunks of the trees and applying a wash. Apparently it was not realized until 1832, when Dr. Harris called attention to the fact, that the insect which caused wormy apples in America was the same as the well-known European insect. The first American

picture of the insect seems to have been the one made by Miss Morris for the "American Agriculturist" in 1846.

The native home of the codling-moth, like that of its principal food, the apple, was doubtless southeastern Europe. It is now a cosmopolitan pest, occurring in nearly every corner of the globe where apples are cultivated. The British Columbian apple-growers seem thus far to have escaped its clutches. When once introduced into a country it spreads rapidly. What little evidence we have indicates that it spread more than half way across the United States in less than twenty-five years, reaching California in 1874. I believe that this single orchard pest not only levies, but collects each year, a tax of from two to three millions of dollars' worth of apples and pears from the fruit growers of each State where fruit is grown extensively. Beside the apple and pear, the insect sometimes attacks wild haws, quinces, plums, peaches, apricots, and cherries.

In nearly all publications, except those in the English language, this pest is now discussed as the "apple worm." While this very appropriate name is also often used by English and American writers, they usually discuss the insect under the perhaps less suggestive name of "codling-moth." It was thus named in 1747 by an English writer. As he figures a Codling tree (the name of a variety of apple tree) in connection with his account, this doubtless suggested the name. The word "codling" is doubtless a corruption of the old English word "querdlyng," meaning at first any immature or half-grown apple, but now applied to certain varieties of apples. At the present time most horticulturists and some entomologists are spelling the name "codlin." There is no etymological evidence in the latest dictionaries to support this dropping of the "g" from the old English diminutive suffix "ling." The scientific name of the insect, *Carpocapsa pomonella*, when translated is found aptly to express its characteristic habits; for the generic term comes from two Greek words meaning, "I eat greedily," and the specific name comes from the Latin word for apple.

All are familiar with the caterpillar stage of this pest, but not so many have seen the adult insect — the pretty little moth. Descriptions of the different stages of the insect are so readily accessible that it is not necessary to dwell upon this point. But there are some features peculiar to the male moths only, which you may

be interested to know about. It was long ago discovered that near the middle of the upper surface of each hind wing in the male there was a peculiar narrow pencil of rather long black hairs, slightly hidden in a furrow of the wing. While looking at the hundred or more bred specimens of the moth which we have in the Cornell University collection, I accidentally discovered that all of the males bore another much more conspicuous, yet constant and peculiar, mark. On the underside of each front wing of the males only there is a narrow, elongate, blackish spot, formed by a group of blackish scales. No one seems to have ever suspected that these spots were sexual characteristics. Thus one can usually determine the sex of a codling-moth at a glance, by the presence or absence of these black markings.

Perhaps the biography of no other insect pest has been written so often as that of the codling-moth. Begun in 1635, it was fairly well understood as early as 1746. And yet, I believe there are still many interesting things to be learned about it, before its biography can be considered as complete. About three weeks after entering the apple, it gets nearly full-grown, and makes an exit tunnel to the surface, closing the outside opening for a few days while it feeds inside. Emerging from the fruit, it usually makes its way to the trunk of the tree, where it soon spins a cocoon under the loose bark. Usually the first worms to spin up in June or July soon transform to pupæ, from which the adult insect emerges in about two weeks, and eggs are soon laid from which a second brood of worms hatch. In most of the more northern portions of the United States, only a part of the worms of the first brood pupate or transform to moths the same season, but in the central, western, and southern portions there is a complete second brood, and in some portions even a third brood of the worms annually. In the fall, all the worms spin cocoons wherever they may be, either in the orchard or in storerooms, and remain curled up in them as caterpillars until spring opens, when they transform, through the pupa, to the moth, thus completing their yearly life-cycle.

Mention of the egg or the habits of the newly-hatched worm was purposely omitted from the above brief summary of the life-story of the insect, because these are the phases of its life which are of vital importance to the horticulturist who sprays, and it is upon these that the most new light has been shed by recent inves-

tigations. The usual stereotyped statement, as taken from our leading text-book on entomology, has been: "The moth lays its eggs singly in the maturing blossom of the apple just as the petals fall. As soon as the caterpillar hatches, it burrows into the apple." Although almost every one who writes about the codling-moth glibly tells when and where the eggs are laid, it is a curious and striking fact that there is no evidence in the literature to show that any one ever saw the egg, as laid in nature, previous to 1889. The first careful observations upon the eggs, and the first picture of one, were published in 1893 in an Oregon Experiment Station Bulletin.

In the spring of 1896 I saw the egg for the first time, and was soon able to find many of them on the young fruits. They are thin, oval, scale-like objects, not quite so large as the head of a common pin. They have been aptly characterized as resembling a minute drop of milk. Instead, however, of finding the eggs where we have been taught for the past century and a half to look, that is, *in* or *on* the calyx, I have never been able to find any there, but I have seen them on the surface of the fruit *near* the calyx, in old curculio scars, near the stem, and even on the leaves of the tree. They were glued to the skin of the fruit or leaf, and being semi-transparent were not easily seen unless the apple was turned so that the light struck the eggs just right. During the past year the eggs have been found in Nebraska, "laid almost exclusively on the upper surface of the leaves adjacent to the fruit." Thus the commonly accepted notion regarding the egg-laying habits of the insect must be discarded. The eggs may be glued anywhere it happens — to the surface of the fruit, on the stem, or even on the adjacent leaves.

There has also been considerable difference of opinion as to *when* the eggs were laid. The common notion has been that they were laid about the time the blossoms fell. From the only definite evidence we have, based upon recent careful observations, one cannot escape the conclusion that, in the northern half of the United States at least, most of the eggs of the codling-moth are not laid until a week or more after the petals fall from most varieties of apples. The egg-laying period lasts for several days, and nearly a hundred eggs may be laid by a single female. Many apparently sterile eggs are laid. The egg stage usually lasts about a week.

It may be of interest to mention in this connection that I found several of these tiny eggs which had an unnatural black appearance. A few days later, instead of little apple worms hatching from them, there appeared in my cages fully developed adult insects, the surprising number of four coming from a single egg. It is wonderful to think of four perfect animals having been born in and having obtained sufficient nourishment to develop into perfect insects from the contents of such a tiny thing as the egg of the codling-moth.

The little apple worm breaks its way out of the egg near the edge, and then wanders about on the surface of the fruit until it finds the calyx, stem, or where a leaf touches. No feeding is done on the outside of the fruit, except to gnaw a minute entrance hole through the skin. More often the little worm squeezes itself through between two of the calyx-lobes and gets its first meals *in* the blossom end.

When I found that most of the worms did not hatch until about two weeks after the blossoms had fallen, I was at a loss to explain how a Paris green spray, applied according to the prescribed rule of "just after the blossoms fall," could possibly affect a worm appearing on the apple so long afterward. Fortunately I had watched the development of the young fruit, and had seen some interesting things taking place which apparently explain this mystery of how we kill the apple worm with a poison spray.

When the petals fall, the small, green calyx-lobes are widely spread out, forming an open saucer-like cavity in which the poison spray could easily be lodged. Within a week, however, these calyx-lobes begin to draw together, and, usually in two weeks after the petals fall, the lobes are drawn tightly together over the cup-shaped blossom-cavity; there is then no possible chance to get any poison into the blossom-end. Few, if any, of the worms hatch before the closing of the calyx-lobes takes place. But about eighty per cent of the young worms enter the young fruits through this calyx-cavity, and they also spend the first few days of their life in feeding in this cavity. Hence I was naturally led to theorize that the poison must lodge in the open calyx-cup, and remain there while Nature proceeds to draw a protecting roof over it. Fortunately, about the time the worms were hatching, I found some apples which had been sprayed with Paris green and

Bordeaux mixture just after the blossoms fell. I could discern with a lens minute bluish particles in the calyx-cups. About fifty of these calyx-cups were submitted to our chemist, and he soon demonstrated the presence of arsenic.

These facts lead me to believe that in applying a poisonous spray soon after the blossoms fall, we deposit some arsenic in the calyx-cavity, where Nature kindly takes care of it for us until ten days or two weeks later, when the little apple worm includes it in the menu of his first few meals. Furthermore, this poisoning of these young worms which enter the developing fruit in the spring seems to be the only way and the only time that the insect is or can be most successfully reached with the spray. Or, put in another way, we can hope to reach with a poison spray only those apple worms which enter the blossom-ends of the forming fruits in the spring. To do this, the application must be made soon after the blossoms fall, when the calyx is open. If we wait a few days, until the calyx-cavity is closed, it will be too late. I can conceive of no possible way in which a majority of the fifteen or twenty per cent of the worms which enter the fruit at some other point in the spring, and all the worms of the subsequent broods, can be effectively reached with a poison spray.

Thus, while the spraying method is very effective, it can never prove a perfect panacea, especially where there are two full broods or more of the insect in a season. However, it is a great improvement over the old banding method, for with the spray we kill the worms before they fairly begin their destructive work, thus saving the fruit they would otherwise ruin with an ugly worm-hole. If it were not for the habit of the worms of feeding in the blossom-end for a few days, it is doubtful whether spraying would be nearly so effective as it is. It is thus a remarkable fact how much of our success in fighting this pest depends upon this trifling habit of the little worms.

In short, to use the poison spray most effectively, one must understand that it is necessary to fill the blossom-end of each apple with poison within a week after the blossoms fall, for this is where the little apple worm gets its first few meals, and it is practically our only chance to kill it with a spray. Watch the developing fruit after the petals fall, and be sure to apply the poison before the calyx-lobes close, for while *the falling of the*

blossoms is the signal to begin spraying, the closing of the calyx-lobes a week or two later is the signal to stop spraying.

Another and familiar insect pest which has received considerable attention at the insectary of the Cornell Experiment Station is the Peach Borer. It is an American insect, and for more than a hundred years it has been recognized as a very serious obstacle to the growing of peaches in this country. Almost every one who has grown this luscious fruit is only too familiar with the telltale gummy mass found around the base of peach trees in which the grub-like caterpillar of this pest is at work.

The life-history and habits of the insect were fairly well known to the earlier writers. In the latitude of New York the borers begin to mature in the latter part of June, and, coming nearly to the surface of the ground, they spin about themselves a cocoon made of silk and particles of bark. The cocoon is usually at the entrance to their burrows. In this cocoon the caterpillar soon transforms to a brown pupa. Two or three weeks later this pupa pushes itself about half way out of its home, and, its skin splitting down its back, a beautiful wasp-like moth emerges. The female differs quite remarkably from the male. As they fly very swiftly during the hotter parts of the day, and frequent flowers, they thus increase their resemblance to wasps. In New York the moths begin to emerge about July 15, and most of them are out by August 1. The females soon begin to glue their small, brown, hard-shelled eggs on to the bark of the trunks of the trees. I have taken two hundred and forty-four eggs from a single female, and nearly six hundred have been found in one in New Jersey. These eggs hatch in from seven to ten days, and the caterpillars at once begin their destructive work under the bark at or below the surface of the ground. They continue to work until cold weather sets in, when they ensconce themselves in a loose, cocoon-like home near the surface of the soil, and there remain all winter without feeding. This winter habit of the borers seems to have been only recently observed. In New York the borers begin work in the spring about May 15, the time varying with the forwardness of the season. From this time on, they feed much and grow very fast. I have seen caterpillars, not over a quarter of an inch long on April 19, get their full growth and transform to the moth by July 20. Thus most of the damage is done in the spring, in May and June, when the

borer gets most of its growth. There is but one brood of borers each year, the one-fourth to one-third grown ones wintering over.

The insect is destructive only in the borer stage, and as it works beneath the surface of the ground it is difficult to get at with remedial measures. Fortunately, the peach tree heals over a wound quickly, and will thus endure and recover from the attacks of several borers or from wounds made by a knife in digging out the pest.

It is a remarkable fact that, although dozens of things have been recommended for preventing the ravages of this common pest, there is no record of any careful experiments against it. Furthermore, it will be found that when some fruit grower claims to have been successful in preventing the work of the borer by the application of a certain substance, he usually discredits the whole thing by incidentally mentioning that he regularly digs out the borers once a year. Why not give the credit to the "digging-out process" where it usually rightfully belongs?

During the past three years we have been experimenting with all of the methods we could find recommended, and have also tested what measures suggested themselves as the work progressed. Four hundred and fifty young peach trees were set rather close together especially for this experiment. Four rows of seven trees each were treated, each row with a different substance usually, and the next two rows left untreated for a check; and so on through the field, duplicating each application at some other portion of the orchard in order to give each as fair and complete a trial as possible. This extensive experiment was scientifically conducted with the utmost care, one year's work checking and furnishing ideas for the following year. All applications were made about the same time, usually during the latter part of June, and everything was done as thoroughly as possible. The following spring every tree, treated or untreated, would be carefully examined, and the number of borers removed from each noted. For three years most of the substances were tested in this thorough manner. A few old and badly infested trees near by always furnished a plentiful supply of the moths to restock our experimental orchard. Every year the four hundred and fifty trees would yield, on an average, at least one borer to each tree. As many as thirteen borers have been found in a single tree less than two inches in diameter.

Twenty-one different things were tried in this experiment, all of which were of a preventive nature except one, carbon bisulphide.

Carbon bisulphide is a very volatile, bad-smelling liquid, which is now being extensively used against the peach borer in one locality in California. Although some who have tried it admit having killed many of their trees, yet one of our correspondents writes that "they cannot get the liquid fast enough." We injected some of the liquid into the soil near several of the trees in our experiment, but we failed to kill any of the borers. It is thus very doubtful whether it will ever help us here in the East in combating the peach borer.

We found the following substances entirely ineffective in preventing the work of the borer; all were washes except one, a mechanical protector of wire gauze:

Assafœtida and Aloes.

Lime, Salt, and Sulphur Wash (extensively used in California for scale insects).

Resin Wash, two applications.

Strong Solution of Hard Soap.

Hard Soap, Carbolic Acid, and Lime (*Hale's Wash*), two applications.

Tallow. — This formed a thick, complete, and very greasy coating lasting until the next year. I cannot understand why it was not more effective. But certainly as many, and one year even more, borers got into those trees treated with tallow than into untreated trees.

Tansy, grown around the base of trees.

Whale Oil Soap, two applications.

Whitewash.

Paint made with Lime and Linseed Oil.

Wire Gauze Protector. — A mosquito wire netting placed around the base of the tree, at a distance of about an inch or more from the bark, and the top edge slit down and then drawn together tightly around the tree and tied, thus making a perfect cage around the tree, extending to the roots and for a distance of about a foot above ground. Theoretically it was a perfect mechanical protector. But in practice more borers were found in trees thus protected than on untreated trees

near by; it was from one of these protected trees that I took thirteen borers. Why the insect preferred these caged trees I cannot explain.

Six of the substances tried proved partially effective; two of these might be termed mechanical:

The old "Mounding System," practised extensively many years ago, apparently kept out about half of the borers.

Tarred Roofing Paper, carefully and tightly wound around the base and extending below the ground to the roots, seemed to protect the trees from all but about one-third of the borers. This proved next to the best preventive tested, but required much care in applying it to accomplish the required result.

White Paint (White Lead and Linseed Oil) apparently kept out from one-half to two-thirds of the insects.

White Paint and Paris Green seemed equally as effective as the white paint, but it injured the bark of the trees so much that some of them eventually died. It may not injure older trees.

Coal Tar, warmed up a little and brushed on, formed a "wash" which proved the most effective thing we tested. Only a very few borers succeeded in getting started in these trees. Coal tar has been reported as injuring or even killing peach trees, but none of our young trees seemed to show the slightest injury, even after fresh applications of the tar had been made on the same trees for three years in succession.

While, as above noted, white paint and Paris green injured the trees more or less, the following substances proved sure death to the trees:

Paris Green mixed with Glue. — This "wash" killed our young trees in about two weeks.

Raupenleim, or German Caterpillar Lime, a substance resembling axle-grease, when applied the first year did not kill the trees and it kept out the borers. But the second year every tree to which it was applied was killed.

Dendrolene, an American imitation of the Raupenleim, which has been extensively recommended and advertised, proved sure death to the trees the first season.

Thus, after three years of careful tests of all the substances which gave promise of being effective, nothing was found that would keep all the borers out and not at the same time injure the tree. Most of the "washes" recommended proved entirely useless, and others only partially effective. To be effective, a wash must have the quality of forming a good, continuous coating over the bark from the first of July until the middle of September; and it must not contain anything that will injure the tree. A wash which has to be applied more than once a year will not pay, for one can dig out the borers quicker. All the washes containing lime usually cracked and peeled off in a week or two, thus necessitating a renewal. To apply properly a wash or a mechanical preventive, one must dig the earth away down to the roots, brush the bark off clean, make the application thoroughly, and then replace the soil. It requires little, if any, more time or labor to dig out the borers than it does to make one thorough application of a wash, or to adjust the tarred paper or wire gauze protector. It is doubtful whether anything will ever be found which will not require renewal every year.

In short, a three years' careful test of all the promising methods for preventing the ravages of the peach borer has convinced us that one can dig out the borers with about as little expenditure of time and money as it will take to apply washes or mechanical contrivances thoroughly enough to keep the borers out. The "digging-out" process is certainly the surest one yet devised.

When shall we dig them out? The borers are most easily discovered in June when they are larger and their work is more conspicuous; hence one is sure to get more of the borers by digging them out at this time. Early in the spring or in the fall the borers are so small that many are often missed. As noted above in telling the life-story of the insect, the one-third or one-half grown caterpillars winter in a thin, cocoon-like home near the surface. During the winter of 1896–97 a warm spell occurred which thawed out the ground to a depth of a few inches. Several wide-awake fruit growers discovered that by simply hoeing away the gummy mass and scraping the bark a little they could remove to a safe distance many of the little borers in their winter homes.

We began this peach-borer experiment confident that some sure preventive against its entrance into the trees would be found, and

there was nothing lacking on our part to have the substances do all that they were recommended to do. Although we did not accomplish our ideal, the experiment did demonstrate what is often equally as valuable and important to know; that is, *to know what not to do.*

Discussion.

J. W. Manning said that he had never found any better remedy than digging out the peach borers; he thought one could not examine the trees too often.

Joseph H. Woodford recalled the statement in regard to washing trees, and asked whether coal tar, if effective, is the most effectual preventive, and whether it kills the trees or not.

Professor Slingerland answered that they expected that it would kill the trees, but after an application on young trees for three successive years it was found that it did not. It kept out nearly all of the borers. Washes are more apt to kill trees if put on before they are established; he would wait until the trees are well started before applying.

Dr. Newhall asked whether spraying while the tree is in blossom did any injury.

Professor Slingerland replied that it did; it not only wets the pollen, but repels insects; they will not visit a wet flower. There is no doubt that you can kill bees by spraying at that time; they not only die themselves, but they take the poison home and their young are killed. The bee-keepers have tried to procure the enactment of a law forbidding spraying when the trees are in blossom. It is, however, done by men who make a contract to spray trees, and they often do it when the trees are in blossom.

Samuel Hartwell asked whether there had ever been more than one worm found in a single fruit.

Professor Slingerland had found five egg-shells on one apple, but found no worm in the apple. He said that four or five apples have been found with more than one worm, but the worms were of different ages.

Rev. Calvin Terry had found coal ashes effectual around peach trees, and thought that there was something in them that is offensive to the borers.

Professor Slingerland said that was really similar to the old mound system, with perhaps something gained from the ashes.

A. W. Cheever asked about the apple maggot.

Professor Slingerland said that it had been very thoroughly studied; it is getting southward and it is a very serious problem. It cannot be harmed with a spray. Hogs might be used to pick the apples up, or the apples could be picked to prevent its spread. Here it is called the "railroad worm."

Mr. Manning said that it has been here for fifty years.

Thomas Harrison inquired whether apple and peach borers are the same.

Professor Slingerland answered that they are very distinct. The peach-tree borer works under the bark, while the apple-tree borer works in the heart of the tree. One is a moth and the other a beetle.

BUSINESS MEETING.

Saturday, February 19, 1898.

A special meeting of the Massachusetts Horticultural Society was holden at half-past twelve o'clock today in accordance with the following request:

Boston, Mass., February 14, 1898.

Hon. Francis H. Appleton, *President of the Massachusetts Horticultural Society, Boston, Mass.:*

Dear Sir: The undersigned, members of the Society, respectfully petition that a meeting be called at as early a date as is practicable, to consider and determine what action the Society will take in the matters of acquiring land for a new building, of erecting a building thereon, of providing funds for such land and building, of disposing of the land and building now owned by the Society, and of managing and disposing of any real estate which the Society has acquired, or may acquire, from the estate of the late Francis B. Hayes; and to transact such other business as may legally come before the meeting.

William C. Strong,	Charles E. Richardson,
Charles H. B. Breck,	Henry S. Adams,
Charles H. Breck,	George F. Peirce,
Jos. H. Woodford,	Archibald Smith,
Robert Manning,	James H. Bowditch,
Mary C. Hewett,	Charles W. Parker.

In compliance with this request, agreeably to Section XII of the Constitution and By-Laws, the following notice was sent to every member of the Society:

MASSACHUSETTS HORTICULTURAL SOCIETY.

BOSTON, February 14, 1898.

Pursuant to the provisions of the Constitution and By-Laws, at the request of twelve members of the Society, the President hereby calls a special meeting of the Society, to be held at Horticultural Hall, 101 Tremont street, Boston, on Saturday, the nineteenth day of February, 1898, at half-past twelve o'clock in the afternoon, to consider and determine what action the Society will take in the matters of acquiring land for a new building, of erecting a building thereon, of providing funds for such land and building, of disposing of the land and building now owned by the Society, and of managing and disposing of any real estate which the Society has acquired, or may acquire, from the estate of the late Francis B. Hayes; and to transact such other business as may legally come before the meeting.

FRANCIS H. APPLETON,
President Massachusetts Horticultural Society.

ROBERT MANNING,
Secretary.

At this meeting the President was in the chair. The call for the meeting was read by the Secretary.

Joseph B. Warner, Esq., counsel for the Society, was introduced by the President, and read the following vote:

Voted, That the Finance Committee, as now or hereafter constituted, is hereby authorized to sell, mortgage, lease, or otherwise dispose of the whole or any part of any property which has been, or hereafter may be, conveyed to this Society by the Trustees under an Indenture of Trust made by Francis B. Hayes and dated June 12, 1889, or be in any way acquired by the Society under said Indenture of Trust, or under the will of said Hayes; and is further authorized, for and in behalf of this Society and in its name or otherwise, and with or without its corporate seal, to make, execute, acknowledge, and deliver, or authorize to be made, executed, acknowledged, and delivered, all deeds, contracts,

or obligations which may be necessary or convenient in effecting such sale, lease, mortgage, or other disposition, including obligations for the repayment of any money borrowed on such mortgage.

The above vote was unanimously carried in the affirmative.

The President then read the following vote:

Voted, That it is expedient for this Society to move from its present building to a new one to be built for its use, and that it is desirable to procure land in the city of Boston for such new building, provided it can be obtained at a satisfactory price.

On motion of O. B. Hadwen, it was voted that when the vote should be taken it be by ballot, and that each member write his name on his ballot.

On motion of J. D. W. French, it was voted that the members be restricted to five-minute speeches.

After a full discussion of the subject the President requested J. D. W. French, James H. Bowditch, Benjamin C. Clark, and William C. Strong to collect and count the ballots.

The President reported the whole number of ballots to be 170, viz.:

Yes	65
No	105

and the vote was defeated.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 19, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, Vice-President Benjamin P. Ware presiding.

The following lecture was delivered:

RAMBLING NOTES ON TREES IN THE STREETS AND ELSEWHERE.

By WILLIAM R. SMITH, Superintendent of the Botanic Garden, Washington, D.C.

"Jock, when ye hae naething else to do, ye may be aye sticking in a tree; it will be growing, Jock, when ye're sleeping," is the advice which Sir Walter Scott put into the mouth of

the dying Laird of Dumbiedikes to his son, and which was actually delivered in these very words by a Highland laird when on his death-bed, to his son. This guid advisement might be followed in most of our States and Territories with the most beneficial results.

"Trees are indeed the glory, the beauty, and the delight of nature. The man who loves not trees, to look at them, to lie under them, to climb up them (once more a schoolboy), would make no bones of murdering Mrs. Jeffs."

"Every man of landed property, that lies fairly out of arm's length of a town, whether free or copyhold, be its rental above or below forty shillings a year, should be a planter. Even an old bachelor, who has no right to become the father of a child, is not only free, but in duty bound to plant a tree. Unless his organ of philoprogenitiveness be small indeed, as he looks at the young, tender plants in his own nursery-garden, his heart will yearn toward them with all the longing and instinctive fondness of a father. As he beholds them putting forth the tender buds of hope he will be careful to preserve them from all blight, he will 'teach the young idea how to shoot,' and, according to their different natures, he will send them to different places to complete their education, according as they are ultimately intended for the church, the bar, or the navy. The old gentleman will be surprised to see how soon his young plants have grown as tall as himself, even though he should be an extraordinary member of the Six Feet Club. An oak sapling, of some five or six springs, shall measure with him on his stocking-soles, and a larch, considerably younger, laugh to shake its pink cones far over his wig. But they are all dutiful children, never go stravaiging from home after youthful follies, and standing together in beautiful bands, and in majestic masses, they will not suffer the noonday sun to smite their father's head, nor the winds of heaven to 'visit his face too roughly.'"

These extracts are from the "Rhapsody" of Christopher North, in "Blackwood's Magazine," April, 1828. This essay was first brought to my notice by a distinguished son of the Commonwealth of Massachusetts, an idealistic lover of trees, Hon. Charles Sumner. His eloquent appeal in the United States Senate to the improvers of the Capitol grounds to spare the splendid specimen of *Carpinus Betulus* growing about a stone's

throw from the Senate chamber is memorable. Alas! his warning was in vain, for the tree is now dead. Its successor, planted by his friend John A. Bingham twenty-five years ago in the Botanic Garden, is a rather handsome specimen. Voltaire was a great lover of this tree. If when you visited his home at Ferney you did not admire the hornbeam hedges and trees you were not invited back. It is much used for hedges and wind-breaks in France and Germany.

I am very much in favor of memorial tree planting in public parks. In the Botanic Garden at Washington we have fifty trees thus made more interesting. Senator Hoar's fine plant of *Cedrus Libani* is of interest to Massachusetts people, and its companion, planted by Senator Evarts, is doing nearly as well.

As to whether the Archbishop of Damascus is correct or not in his assumption that Solomon planted this species with his own hands in the quincunx manner, as they now stand in the valley of Mount Lebanon, we will not venture an opinion. Lamartine, who visited these trees in 1832, very properly says, "They are the most renowned natural monuments in the universe." Religion, poetry, and history have all equally celebrated them. In Washington they have flourished forty years without injury. At Claremont and Sion House, in the neighborhood of London, there are Cedars of Lebanon over one hundred years old, and eighty feet in height. At Hopton House, near Edinburgh, and at Beaufort Castle, in the highlands of Scotland, there are trees over one hundred years old. At the latter place it is said the tree rises with all that boldness of outline and permanence of aspect which render it the glory of Lebanon and the boast of Palestine. It is to be hoped that this tree will be more planted in the future. It is especially adapted to cemeteries.

We saw, when last in Edinburgh, one hundred thousand young trees of this kind in the nurseries there. Will my enthusiastic friend Mr. Jackson Dawson inform us what he saw of *Cedrus Libani* and its varieties when there last year?

As to trees in the streets, there are two sides to the subject. There is no doubt that trees are an absolute necessity in the wide asphalt, or other paved streets in the city of Washington. But even there business streets as a rule are not treed. After the powers that be, in cities, towns, or villages, have carefully considered whether or not trees are desirable, and it has been

decided in the affirmative, we should like to make a few suggestions — not directions — gathered from an experience of over twenty years, as Chairman of the Tree Parking Commission in Washington, where we have planted over seventy thousand trees in the streets, avenues, and parkings. As failures in this matter are not only expensive, but disappointing, we would recommend that you secure the best talent available. If experience is limited see that your advisers have that with which the great painter Opie mixed his colors. "With brains, sir," was his gruff reply to the dilettante who asked him how he did it.

In Washington, where the soil is generally poor, we usually remove two or three good sized cart loads from a hole and replace with the best top soil to be had. We do this in dry weather for obvious reasons: we stir up the bottom and avoid compacting the sides of the hole. Do not plant too close. The character of the tree selected must determine the distance apart.

I hold myself chiefly responsible for a great mistake in Washington, which was corrected by my kind friend Major Twining, engineer in charge of public works in the District of Columbia, with the remark: "Smith, you have planted your trees too close, or not close enough, so as to admit the cutting out of every other one." This matter was better regulated afterward.

One important aid to success is the tree box. It is doubtful whether shading the stem of the tree from the sun, to prevent scalding, or holding the newly-planted tree steady, is its most valuable service. The straps should be carefully arranged and properly fastened. Four chestnut stakes, five feet and a half in length, are driven into the ground and well nailed to the box. A photograph of the trees and boxes, together with a map of the city, for which I am indebted to Mr. John W. Langdale, an employee of the Parking Commission, who is responsible for its accuracy in detail (and I indorse it), located the sixty-four kinds of trees in the streets, avenues, and parking in the city of Washington. The little parks and most of the reservations are under another management. This map and photographs will be left for consultation in an institution you should be thankful for and proud of — your great Horticultural Library.

Do not attempt to go into the woods or uncultivated ground for trees, except as a dire necessity. We were compelled to do this at first, for some things, and were moderately successful

with American sycamores, elms, scarlet maples, and tulip trees. They were not to be had in the nurseries at the time. By transferring them to cultivated ground in the nursery established by authority of Governor Shepard, and cutting them severely back, educating them for their duty in life, we got moderately good results; but it is my deliberate opinion that in the interest of economy it is better to get nursery-grown young trees. Every city or village or suburban town ambitious for distinction as to being well treed should have a nursery of its own, where healthy trees can be reared. Get clean seedlings from some reliable source; cultivate, prune, and train them in the way they should grow, in the best ground attainable. This last suggestion is of great importance. Trees from a poor, thin, gravelly soil, or from a wet, sour, undrained one, are worthless.

That queen of American trees, the sugar maple, is useless from such a source. This lovely tree, when barkbound from any cause, should be dispensed with, and a young healthy one substituted. It refuses to do duty as a curbstone tree in Washington. Like an Arab steed hitched to a dray, when planted with pavement to the right of it, pavement to the left of it, and a curbstone barricade in front of it, it rebels. How can it, under such circumstances, develop that beauty for which it is so famous? Vermont avenue and H street, west of the War Department, were planted with this tree, but it is anything but a success. A beautiful avenue of sixty sugar maples, brought as small trees from the mountains of Kentucky and planted from the mansion to the spring of Francis P. Blair, General Jackson's great friend and my earliest friend in Washington (his place being known as Silver Spring), flourished grandly for twenty-five or thirty years. Then all at once they lost heart and died; just why I am unable to say. A Norway maple I planted as substitute for one killed by accident still thrives. There are some good specimens in the Smithsonian grounds, not far from the monument to Mr. Downing, in well-drained naturally good ground, planted there under his direction.

The two we planted in the filled-up ground in the Botanic Garden also lost heart and died; while a black-sugar adjoining them is one of the handsomest trees in the garden. They were planted thirty years ago. The Norway maple is one of the best curbstone trees, less self-asserting than some others, but selected

for Sixteenth street, which leads from the President's mansion to the north District line, a distance of six miles. This avenue is one hundred and sixty feet wide, and two miles of it is finished. For the parking, it was my privilege to present the beautiful Liriodendron or Tulip trees, with which it is planted, to the city. This street is, we believe, to be called Executive avenue. If the trees are well cared for it will make the handsomest avenue in Washington. The tulip tree is not, in my opinion, a good curb-stone tree.

But permit me to introduce one which I think is among the best as a curb tree, *Salisburia adiantifolia*, the Ginkgo of the Japanese, or Maiden Hair tree of the botanists. Two of these interesting trees have flourished in Washington for sixty years or more, apart, however, and being unisexual no seed was produced. We were two years rooting a hardwood cutting and have a good tree thus propagated. Mr. Jardine, a Frenchman, an importer of trees and shrubs, sold to the British Legation two ginkgos to plant one each side of the *porte cochère*. He charged seven dollars and fifty cents apiece for them. The bill was disputed, and we were made referee. The matter was compromised at five dollars each. Shortly after, when searching for street trees, I visited Hoopes Brothers & Thomas, West Chester, Pa. Walking through the nursery with my friend Josiah Hoopes, we came to a large block of ginkgos. "There," he says, "you know that's a good thing, but our agents won't touch it. It won't sell." "What will you take for it?" I asked. "I'll take forty cents apiece just to get rid of it," was his reply. We bargained for three hundred. Pierce street is now planted with them; also another short street, Seventeenth and a half, just west of Lafayette square, where they are not so fine as on Pierce street, owing to their being robbed by adjoining elms in the square, and the soil being not so good. On Pierce street may be seen the effects of planting too close; nevertheless, they are very fine, and fruit freely. I have never seen an insect near them. This tree has a very interesting Boston history, which we find in Hooker's "Journal of Botany and Kew Garden Miscellany," Vol. 2, 1850, p. 318, under the heading, "The Ginkgo Tree on Boston Common." A ginkgo tree formerly stood in a garden belonging to Mr. Greene, which garden was in the centre of Boston. After his death (1832) the house and grounds were sold. This tree was

removed at the partial cost of the city (each of Mr. Greene's children paying a hundred dollars towards the expense) to the mall encircling the Common, and planted before the windows of Mrs. Greene's house, in which she resided after her husband's death. The tree is a native of China, and was of full size when Mr. Greene, Sr., purchased the garden in 1798. It is now in fine leaf and beauty. The accompanying lines by Dr. Bigelow appeared in the public papers some months after the tree's removal. This poem consists of fifteen stanzas. We quote the last:

"And so thou hast survived thy fall,
And fairly disappointed all
Who thought to see thee down;
And better days are stored for thee —
Long shalt thou live, triumphant tree,
And spread thy foliage broad and free,
A credit to the town."

Is this individual tree still triumphant? If not, how long did it live? Mr. Downing, three years afterwards, wrote with approval of the operation of transplanting it. He gave its height as forty feet and its circumference as three feet. How is it now? A full history would be interesting.[1]

I have never been in favor of expending large sums of money for moving trees, even to satisfy public demand. I have looked in vain for permanent success in this matter. It usually takes a young healthy tree about the same time to grow up as it does a large one to die, after being removed. The experience of the Chicago people, years ago, with their high-priced, half-dead trees, is an example. Around the National Capitol, with great care and skill, under the direction of Mr. Olmsted, liberal sums were expended to lower and remove large trees of various kinds in considerable number. But none are left to tell the tale of their tribulations, with the exception of a few of the smaller ones, notably a European walnut, twenty feet high, twelve inches at the ground line; first raised in a pot from seed grown in Wash-

[1] The ginkgo tree above mentioned is now four and a half feet in circumference at five feet above the ground, which has apparently been filled in round it, as no part of the swell of the roots is visible. As nearly as can be judged by the eye it is about sixty feet high. The limbs still show where they were shortened when the tree was transplanted. The lower limbs have made little growth, which is doubtless partly due to other trees standing near, but near the top it has made strong, vigorous shoots. It stands in the inner row on the Beacon street mall, opposite No. 33 Beacon street. — Ed.

ington and twice transplanted in the Botanic Garden, owing to the change of grade. It was removed to the south side of the Capitol, east, where it is a fine tree, bearing abundantly. Such valuable seeds, however, are usually secured by the small boy, much to my chagrin. I think hardier trees might be obtained by planting the seeds. It is to be regretted that the Middle States do not take this matter up. We should not send money abroad for walnuts. California does not, but freight from there is expensive. Some *Quercus macrocarpa* and *Q. palustris*, about the same size, were also moved. They have thoroughly recovered and are goodly trees.

Much more might be written on this subject, but it is enough if I get you to observe and think before spending money on transplanting large trees.

The Western Rock Elm, *Ulmus racemosa*, is a tree worthy of more attention than it has received. A dozen or more trees as curbstone trees, mixed with the other elms, are not attacked by an insect, as far as my observation goes. The two in the Botanic Garden, never. Professor Sargent, in "The Garden" (London, Aug. 10, 1878), writes of this tree as being valuable for making agricultural implements; its wood as being susceptible of a high polish, fitted for a hard finish; and its heating power nearly equal to that of hickory. It is a good street tree (nurserymen, make a note of this).

The Wahoo Elm, *Ulmus alata*, is another species not attacked by insects. The first living specimen Professor Gray ever saw was the tree I dug up in Richmond before the war. It is now a large tree, never injured by the weather. It is worthy of trial much farther north. There are fifty of these trees in the streets and parks of our city, too bitter, I think, for even hungry insects.

I have only to mention the majestic American Elm and say, "Give it room, it must have room." To say more in New England would be supererogation. Another remark we might make is that it bears the knife when young, but not the saw in after-time. Only dire necessity should be the excuse.

The Eastern Plane, *Platanus orientalis*, in Washington, is one of the best all-around street trees. The first planted in the District, as far as I can learn, was the one that we now call Thaddeus Stevens's Memorial Tree. At his suggestion two stalwart contrabands planted it in the Botanic Garden, on the

bank of the Tiber, the arching of which caused its removal to Lincoln square, where it stands a gem, occupying the centre, with its branches on the ground, shading its stem in a natural manner.

Frederick Law Olmsted, a man endeared to every lover of trees and landscape art, has used this tree with fine effect on the east side of the Peace Monument. We planted the occidental species on the west side of the same circle. Mr. Olmsted has also, after the manner of the ancient Romans, who were great admirers of this tree, planted the two western approaches to the Capitol with it. They are beginning to bear seed, and will soon be disseminated over the whole country, and thus the question where they will thrive will be tested. Evelyn's "Sylva" has some interesting stories about this tree.

Senators Hansbrough and Kyle are, with some success, trying them in the land of the Dakotas.

We have several streets planted with the Occidental Plane, *Platanus occidentalis*. They are greatly improved when severely trimmed; even the hollow-stemmed old specimens on Pennsylvania avenue, when so treated, were greatly renovated in appearance.

Another tree not troubled with insects is the Three-thorned Acacia, *Gleditschia triacanthos*. It bears pruning and is improved by it. We raise most of the trees from the variety *inermis*, but they come spiny, — not so many, however, as from the thorny type.

The Sweet Gum, *Liquidambar styraciflua*, Alexander Hamilton's American emblematic tree, is only a moderate success on the curbstone. Insects attack it On the lawn it is better.

I have doubts about the genus Quercus as curbstone trees. As lawn trees, or in lines in the parking, they are grand. Pennsylvania avenue, east of the Capitol, is planted in the middle with *Quercus palustris*. They are doing well. It is to be regretted that it was not made uniform, as suggested by our dear departed friend Mr. Stiles, who saw, approved, and admired the two rows, half a mile long, of this oak, and said, "How grand it would be if continued to the Capitol!" See "Garden and Forest," 1894, for his notes on this subject. *Quercus rubra*, on Twelfth street, will be a grand double row in the near future, planted four feet from the curb in a continuous strip of parking.

Massachusetts avenue, four miles long, is planted with four rows of American Lindens, *Tilia Americana*: they are doing well.

It is not a perfect tree, but much better than the European Linden, which is apt to be destroyed by the borer.

The same may be said of the ash, especially the European species, *Fraxinus excelsa.* This is a very variable species, but none of the forms escape this terrible enemy. The American species he is not quite so successful in disfiguring and destroying. In the Botanic Garden there is a fine specimen of *Fraxinus Americana,* which has braved the storms of at least sixty winters or more. A cyclone broke it up about six years ago, necessitating its being headed back. It is now an ideal tree in summer; in winter not quite so idealistic. *Fraxinus pubescens* and *F. quadrangularis* are worthy of trial where there is good soil.

In a dainty little rare volume, with the author's autograph as a token of lifelong friendship to your humble servant, styled "The American Handbook of Ornamental Trees," by Thomas Meehan, Gardener, 1853, I find the following, under *Acer dasycarpum:* "One of the finest of our native trees. It is so often seen in a half-starved, stunted state, as a street tree, that one might be incredulous of its beauty, when under proper circumstances, from a mere description." One would think the talented editor and honored professor had recently visited the city of Washington. His description suits the actuality there at the present time. The clamor against tree trimming has nearly ruined the twenty-three thousand we have planted as curb trees in Washington. The limited supply of moisture and food obtainable in that position renders it necessary that this large growing tree should be judiciously pruned. It is not an idealistic theory, it is a condition that confronts us in this case. With roots caged and confined it is not possible for it to sustain a large top. Intelligence should take this whole situation into consideration and act accordingly. The habits and habitat of the trees should receive careful consideration.

Acer rubrum, the Red, or Swamp Maple. The latter name indicates the position for which it is best suited. Not being able to obtain this tree in the nurseries, we went to the woods, with but moderate success. Had we cut the small trees to the ground, when planting them in the nursery, I think we should have done better. Its gorgeous autumnal tints make it an object of great interest to every lover of trees.

Acer negundo, the Ash-Leaved Maple. This early herald of spring, with its beautiful green foliage and its rapid growth, would be an excellent street tree were it not for the bag-worm and web-caterpillar being so fond of it. In this respect it rivals the native cherries. If adopted, be vigilant to remove the bag-worms during the winter months, and watch carefully for the web-caterpillar in early summer. It should be skilfully pruned to keep it in good health.

Acer Pseudo-Platanus, or Sycamore Maple. With [illegible] mountain tree we have had only moderate success. It gets covered with seeds, indicating its arrival at maturity, — a desirable condition in fruit orchards, but not in a street tree. (See Dr. Lindley's "Theory of Horticulture" on this subject.) There are many good specimens in Washington. A variety with the leaves a fine purple underneath comes true from seed, and is a striking object in the Capitol grounds when its leaves are moved by the wind.

Some fine specimens of *Acer campestre*, "the Turn-table Maple of the Romans," branching to the ground, forming handsome pyramids, planted there under the direction of Mr. Olmsted, have been tomahawked lately, agreeably to an uninstructed, semi-popular request.

Acer campestre Austriacum grows more freely, and is altogether a larger, different appearing tree, and may, when more abundant, make a street tree. It has not the dwarf habit of the species.

Æsculus Hippocastanum, the Horse Chestnut. We achieved satisfactory results with this tree on both Thirteenth and De Salles streets, owing to the opportunity afforded by the heavy filling required there. In poor soil, with no chance to root deep, by the last of summer it is not beautiful to look upon.

Permit me here to name a few probationers for the office of street decoration, and as sanitary cooling agents: *Phellodendron Amurense*: this, I think, would fill both offices. *Zelkova crenata*, *Z. acuminata*, *Celtis occidentalis*, American nettle tree, and *C. crassifolia*, the hackberry. These we would call necessity trees. Birds get the fruit in hard weather, and for this reason we recommend them to be planted largely in parks and other public places.

Catalpa Kæmpferi, of Japan. Railroad ties have been cut from this tree grown on the farm of Hon. Edwin H. Funston,

Iola, Kan., from seed furnished him by us in 1885. It is of more upright habit than the American species, and is, I think, a probable street tree in some sections. It is much used in wood engraving in Japan.

Ostrya Virginica (American Hop Hornbeam or Lever-wood) would make a nice small, but rather slow-growing street tree. It could be trimmed to a pyramid of dainty, enduring proportions.

Kælreuteria paniculata, a small tree, much used by Mr. Olmsted in the Capitol grounds, is beautiful in leaf and flower, and its seed pod is interesting. Its habit makes it a doubtful candidate for street decoration.

I make bold to recommend that much abused tree, *Ailanthus glandulosa*, for certain streets. I quote from memory, from Mr. Linch, Curator of the Oxford Botanic Gardens. He says in an English paper: "There are twenty thousand of these trees in the streets of Paris." The objection to its bad odor when in flower can be overcome by cutting it back every two or three years. You will then get a rich tropical foliage and a low tree. I doubt whether it can be cured of its bad habit of suckering. It might help the matter to raise them from seed. Ex-Mayor Wallach informed me that there was a law against planting them in the District of Columbia, so none were planted.

Cedrela Sinensis flourishes in the city of Washington, but, like its near relative, the Ailanthus, it has the habit of throwing up shoots from the roots. Its usefulness has yet to be determined.

Populus angulata, the Carolina Poplar. We purchased one plant from the most scientific nurseryman of his age in the United States, W. D. Brackenridge, and planted it with others on the towpath of the canal on Third street, now a part of the Botanic Garden, where the original tree still lives; it is thirty-five years old, and not an ornament, but of interest as being the parent of eighty thousand trees planted and disseminated as cuttings. The talented botanist of the Agricultural Department, Professor Coville, illustrated the closeness of his observations by informing me as a curious fact that the *Populus angulata* were all male trees, and that the Necklace Poplar, *P. monilifera*, — an inferior tree mixed with them, — were females. We explained the matter by informing him they were all propagated from two trees procured from Brackenridge. Another tree from the same source, *Populus Græca*, first found near a village called Athens,

in the State of Illinois, is a good tree for narrow streets. Unlike its kindred pyramidal species, the Lombardy and Bolleana, it is not attacked by the borer, as far as my observation goes. It and the two trees first named, unless carefully pruned, become top-heavy, keep dropping their leaves all summer, and soon become dangerous to life and property. I regret to say hundreds of trees are in this condition at the present time in the city of Washington. For various reasons their trimming has been neglected.

The family to which they belong, *Salicaceæ*, affect damp, swampy, ague-breeding places, and in various ways are candidates for the high honors of quinine, as a cure for intermittent fever. As a preventive, if the five hundred acres of swamp land with which the city of Washington is surrounded, south and east, were planted with poplars and willows, their sanitary value would be immense. And then the charcoal, for making gunpowder, from the willows, might be an economic item in the future. Again, the more they are filled upon the faster they grow. My kind friend, the late Mr. Peter Henderson, in "Harper's Monthly Magazine," July, 1888, has some judicious remarks on this subject. The list of trees in that article, and the list on the map of Capt. W. F. Rossell, is a list of trees existing — not those selected by the Commission.

Professor Sargent, in "Garden and Forest," Jan. 17, 1894, criticised the list of trees recommended by various individuals for planting in Brooklyn. I agree with the learned professor in his remarks in nearly every particular. Those seeking light on this subject should read that article. It is especially instructive as to the trees not to be used in street planting.

It may interest you to know that the Camphor tree, *Laurus camphora*, is being planted as a street tree in New Orleans. A tree in a four-inch pot presented to the beautiful niece of Mr. R. Maitre, the distinguished horticulturist of New Orleans, in 1883, is now thirty-five feet high and fifty-two inches in circumference at the butt. From this tree we have received a liberal supply of seed each year.

President Jefferson's favorite tree was the Willow Oak, his enthusiasm for which is graphically described by his biographer, R. S. Raynor. Unless well supplied with food grows slowly. A few are planted on the street in front of the Treasury building. We would recommend that groves of it be planted in the various

parks or public places throughout the country, by his admirers, each individual planting a tree; none to be allowed to plant one, however, who has not reached his high intellectual plane of love for trees. A magnificent specimen stands as a sentinel near the monument of that intellectual aristocrat and truly great and good man, Professor Henry. It is seventy feet high, and eleven feet in circumference six inches from the ground.

By cutting back severely, carefully watering when necessary, and cultivating with the assiduity which a good farmer uses towards his corn crop, we reached a phenomenal success in the early days of tree planting in Washington.

Do not let dudeism drive from your street trees the white-washer. If he uses lime, blue or other colored clay, sulphur, lampblack, salt, or other material, he will greatly improve your trees and add to the health of the neighborhood — perhaps killing the much dreaded microbes of diseases. Scale insects, fungi, and lichens it will destroy. But it will not stop horses from gnawing the bark; woven wire must be used for that. For bad boys who injure trees, and for gas leaks, it is difficult to suggest remedies. I can only say mend the latter and try to improve the former.

Arbor Day and Memorial Tree Planting should go hand in hand, creating a sentiment of love and veneration for trees.

Gentlemen: After I had accepted the kind invitation of your excellent Committee to appear before you I was astonished at my self-assurance in undertaking to address the most ancient, most successful, most honored horticultural society on the continent of North America. My tribulations are now over. I thank you for the privilege and for your kind attention.

Discussion.

Dr. Goodell thought that one very important matter not alluded to is what to do with the electric enemy.

Mr. Smith said he is so angry about it that he did not care to mention it. It is very destructive, and often kills trees.

O. B. Hadwen did not want to walk behind any one in the love for trees; he grows more as he grows older, and has in his grounds most of the trees spoken of by the lecturer. He said that he has a tulip tree which is eighty feet high, elms that are nine feet in circumference, and some black walnut furniture

made from trees which he had himself planted. His love is not only for conifers, but for deciduous trees as well. He asked whether the Ginkgo of Japan and the Ginkgo of China are the same. He thought that trees here in New England want high feeding.

Mr. Smith said that the Ginkgo of China and Japan are the same.

Thomas Harrison questioned what should be done with electric corporations. He thought that they should be obliged to put an insulator on trees to which wires are attached. As it is now, as soon as the covering to the wire is worn off by rubbing against the tree, the tree is set on fire.

Rev. C. S. Harrison believed in Arbor Day, and was interested in planting trees in treeless places. He spoke of one town which was planned so as to have the tall, quick-growing trees in the centre, and the slower-growing at the outside, with the view of forming a pyramid of green as seen from a distance. This was very well in the plan, but when carried out the people used the trees for hitching posts, and the horses ate off the bark, resulting in a loss of so many trees that the design was not successful. In the West, the Box-Elder, *Negundo aceroides*, has been discarded; it does not grow to any height, and is a harbor for many insects which come into the houses and deface the carpets, as they leave a red spot wherever crushed. He would advise the use of one tree only for a street.

Jacob W. Manning spoke of the value of *Celtis occidentalis*, the Nettle Tree or Hackberry, as a shade tree; it is perfectly hardy for the West and from Canada to Mexico. The largest tree he knows of is in West Springfield; it has a spread of seventy feet, and is six feet in diameter at the base. He said the Cottonwood, *Populus monilifera*, grows to a gigantic size, with a trunk from six to seven feet in diameter. There are great trees in the north — one near Downing's place at Newburg on the Hudson. He had noticed the Red Oak in Washington, and thought that fine effects have already been obtained with it.

Vice-President Ware noted that tree-planting had been suggested for bachelors. They can propagate trees.

Thomas C. Thurlow thought people often planted trees too thickly, and advised that great care should be taken not to plant too closely around houses, and especially on the street and

directly in front of the house. Sunshine is as necessary as shade, and it is as great a mistake to shut out all sunshine from our dwellings as it is to have no trees at all. He recommended people to procure competent advice before planting trees on our home grounds, or in the streets, etc., and thought we should use our native trees rather than send to foreign countries to get what are often not nearly as desirable.

Dr. Goodell asked how close to plant trees on streets. He suggested that not over one tree to a fifty-foot lot would be about right.

Mr. Smith said that these matters should be regulated by the law. He advised using one kind of tree to each street, and would avoid planting too thickly. Lindens should be planted about fifty feet apart, and elms at least sixty feet.

Mr. Manning thought that elms vary so much in size that they need various distances; some want more than one hundred feet. He suggested at least forty or fifty feet as necessary for street trees.

Mr. Smith said that in New Jersey avenue, in Washington, the trees are as large again in one place as in another. Everything should be considered and regulated by careful study. Plant wider apart in good soil than in poor.

Thomas Harrison inquired whether any fixed rules about pruning could be given.

Mr. Smith replied that the pruning required varies with each tree.

Mr. Hadwen noted that in Washington they had taken out two or three loads of poor material and replaced this with good soil. This, he said, is very important: the foliage and rate of growth are very different in good soil. The older he grows the more he doubts the value of putting trees in the sidewalk. He would plant them at least four or five feet within his own ground; they are then under his supervision.

G. L. Thorne, of Buffalo, N.Y., said that he had planted a good many trees — more than any of the Commissions in Buffalo have — and had found that common sense must be used. Some kinds do not grow well, so one must vary the distances, and also vary the distances with the condition of the land. Get a good tree, he said, to start with; here he has spent a good deal of money and finds that it pays. He suggested that two rows of

trees be planted where possible; then if something happens to one tree the other row will have one to take its place. Plant elms fifty feet apart. Soft maples planted in wet land, if well taken care of, are very satisfactory.

Daniel Sullivan said that if Paris and Washington had made good conditions for tree planting he did not see why we could not.

Mr. Manning replied that we could; but he had seen in Reading two trees planted, one at one end of the town in a gravelly region, where the gravel had been removed and replaced by good loam and the other in naturally good soil; the latter is now in the better condition, showing that, although preparation is made, the results will not be as good as where the soil is naturally good.

Jackson Dawson said that in order to get good trees you must have good holes; if you would have fine trees then first give the tree something to eat. He spoke of the remarks which have recently appeared in the papers about thinning out trees, and compared this work with the killing of trees by electricity, about which people say nothing. If we are going to plant trees we must have laws which will protect the trees. For street trees, he said, the Norway maple is good for short streets. The soft maple is too easily broken to be desirable. The liquidambar would probably be excellent. The tulip tree is brittle. The oaks are the coming trees for this climate. The black walnut is good, but sheds its leaves early. The chestnut is also good, particularly when in flower; it is, however, a dirty tree.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 26, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was read by James Sturgis Pray, Secretary of the Columbine Association:

THE NATIONAL FLOWER MOVEMENT.

By FREDERICK LEROY SARGENT, President of the Columbine Association, Cambridge.

Mr. President and Ladies and Gentlemen:

During the fortunate years of peace that have thus far blessed the second century of our national independence, we have seen

develop throughout the United States a popular movement which is surely unique in the history of the world. This is the movement to bring about the adoption of a national flower. Here is a matter of pure sentiment seeking legislative recognition; a question of taste, if you will, leading to widespread organized efforts, to the formation of national societies, and to the calling of a national convention. Among the many interesting manifestations of American feeling which have characterized the close of the nineteenth century surely this unprecedented outcome is not the least worthy of our attention.

The desire for a national flower — now so widely felt among the best people of our country — springs mainly from two sentiments which all of us would cherish. These are the love of our native flowers and the love of our native land. To confirm the feeling that these sentiments are closely akin we need hardly be reminded that the floral emblems of other nations have played an important part in their history. For us a fitting national flower would bring to the service of patriotism an emblem whereby our love for the fatherland would find expression through one of its fairest products. If our people shall ever come to enjoy the benefits of such an emblem surely every true American must rejoice.

It cannot be claimed that the efforts which have been made to this end have always been wise. In fact, as we shall see, they have often been of the sort which adds to the griefs of the judicious. Nevertheless we cannot fail to find much that is helpful to the general movement in every earnest effort to be of service in this matter, and the helpfulness will be quite apart from the apparent achievement. However mistaken or ill-directed we may choose to consider the efforts which are opposed to our own, we may be sure they have all something to teach us and not a little for us to admire.

So far as I have been able to learn, the first candidate to be publicly suggested for our floral emblem was the mayflower, or trailing arbutus (*Epigæa repens*). The idea, I believe, came originally from a lady in Pennsylvania, Miss Margaret B. Harvey, who made it the theme of a poem, which she wrote while living near the site of General Washington's camp at Valley Forge. This poem was entitled "The National Flower, or Valley Forge Arbutus," and was published in March, 1887. Other poems inspired

by the charming qualities of this modest little flower have appeared from time to time.

The principal reasons which have been advanced for adopting it as our national floral emblem are these: It was one of the first blossoms seen by the Pilgrims at Plymouth after landing from the "Mayflower," and by Washington's army after their winter at Valley Forge. Its flowers suggest five-pointed stars, and its leaves are laurel-like. It grows wild in the thirteen original States, and displays an independence of spirit by defying cultivation.

Unfortunately, these alleged qualifications depend, for the most part, upon features that should entirely disqualify any candidate. Thus, its early blooming, which with us makes it a flower of April rather than of May, renders the blossoms unavailable for decoration on any national holiday — that is to say, when we should most wish to use them. Moreover, not only is the plant unknown in the wild state over three-quarters of our territory, but to those of our fellow Americans who dwell in that vast region it must remain unknown even in cultivation.

These facts are perhaps sufficient to show that the trailing arbutus is quite undesirable for our national flower, no matter what historical associations it may possess. But these very associations are most unfortunate. For this flower has been recognized for several generations as the floral emblem of Nova Scotia. As such it has appeared on coins and postage stamps of that province; it has been used in important ways in their historical celebrations; and on certain flags widely used by the Nova Scotians it occurs as a device accompanied by the motto, "We bloom amid the snows." The Nova Scotians are certainly to be congratulated upon having a floral emblem so admirably fitted for their purposes. With regard to those Americans who have wished us to take this emblem for our own it is but charitable to suppose that they have done so largely in ignorance of Nova Scotia's claim. We know that many who at first wished us to have the mayflower have now abandoned the idea. As to those who still cling to it, let us hope that their ideal of patriotism and national honor is not, as it would seem to be, disregardful of the commandment, "Thou shalt not steal," or of that which says, "Thou shalt not covet . . . anything that is thy neighbor's."

In many ways a more happy suggestion was that of the golden-rod (Solidago). I am informed by Miss Harvey that this idea

was published first in the Boston "Globe," in May, 1888. The fact that golden-rod grows wild in such profusion almost everywhere in the United States, and is such a brilliant adornment of the roadside, made it at once a very popular candidate. Its generous wealth and aspiring air of freedom soon found appropriate expression in verse. To some the composite nature of its ample clusters exemplified our motto, "*E pluribus unum.*" To others the golden color of the blossom seemed a fitting symbol of the gold standard which they upheld during our recent presidential campaign.

In 1889 a booklet, containing chromolithographs of the golden-rod and the mayflower, was issued by Messrs. L. Prang & Co., with a view to testing public opinion on the national flower question. Copies of the booklet were sent to a number of prominent persons, with the request that they tell what flower they would prefer for the floral emblem of the nation. Of the replies received, a large majority were in favor of the golden-rod. Not long after, a canvass of votes among school children, chiefly in New York State, showed a similar preference for the same flower. It was doubtless because of the enthusiasm then shown that the New York "Recorder" in 1895 issued a colored picture of a bunch of golden-rod, tied with a red, white, and blue ribbon, and labelled "The National Favorite."

For a while it looked as if all this enthusiasm would carry the day for the golden-rod. But a growing dissatisfaction was yet to be reckoned with — a dissatisfaction which continually increased among those who first welcomed the golden-rod as a candidate.

Such a revulsion was sure to come as soon as the golden-rod advocates attempted to use their flower for decorative or other purposes. They could not decorate with it on Memorial Day or on the Fourth of July, because it does not reach its prime until August or September. Even when it was in bloom they found it unsuited for indoor use. Its color, upon which they so much depended, was found to be dingy and unattractive when away from the strong light of the sun.

Its use indoors, moreover, met with vigorous protest in the interest of health, for physicians maintain that the emanations of this plant frequently produce asthma and are an exciting cause of hay fever or autumnal catarrh. Farmers either despise it as the "yaller weed," or hate it because of its dark record of injury to cattle, while, according to a recent announcement, the State Veter-

inarian of Wisconsin considers it to be the cause of a disease resembling consumption which has been killing thousands of horses.

The efforts to use representations of the golden-rod for decorative purposes have been scarcely more successful than the attempts to use the flower itself. When it has been impossible for the artist to indicate the color (as must often be the case in decorative design) he has felt it necessary to add a label conveying the information, "This is a golden-rod."

While practical considerations turned many people against the idea of making the golden-rod a national emblem, many others, with whom sentiment was paramount, soon came to see that arrogant aggression, cheap display, the false liberty which is unmindful of the rights of others, were characteristics which would make this plant a deplorable symbol for the American people.

As the Columbian celebrations approached the desire for a national flower grew apace and stimulated the efforts of many people in various parts of the country to bring about the adoption of some fitting floral representative. The most noteworthy of these attempts were in connection with the pansy (*Viola tricolor*) and the Indian corn (*Zea Mays*).

In comparison with the golden-rod the pansy, as will be seen, has the decided advantages of variety of color and simplicity and distinctiveness of form, combined with entire harmlessness. But on the other hand it lacks the necessary qualification of being a native flower, and is entirely without associations that would connect it with our country rather than with any other.

The suggestion of this flower, and the organization of the Pansy Society of America, is to be attributed, I believe, to Mr. Albert C. Hopkins, of Nashua, Ia. What has been published regarding the society would indicate that its efforts were chiefly among children in schools. At this distance from the scene of its activities it is difficult to form any just idea of the extent of its influence. It must be said, however, that its power, in 1892, was sufficient to induce the Hon. Walt H. Butler, Representative from Iowa, to introduce into Congress two bills embodying the views of the society. The first of these provides, in Section I, "That on and after the first day of May, A.D. 1893, the official and recognized floral emblem of the United States of America shall be the flower commonly known as the pansy; named also garden violet, hearts-ease, and so forth." Section II requires, "That the

national sentiment expressed in connection with this emblem shall be justice, liberty, union, culture, and peace; and that the last three words — union, culture, and peace — shall constitute the motto;" and Section III, "That the inauguration of this emblem shall be duly and fittingly celebrated on the first day of May, A.D. 1893, in connection with the opening of the World's Columbian Exposition." The other bill is intended "to make more definite, uniform, and symbolic the flag of the United States." The main provisions of this bill are first, that the union or blue field of the flag "shall hold the outline of a white pansy with a true pansy centre, which shall represent the capitol or central government; that the white stars, representing the States, shall be set inside the white outline of the pansy in a manner to produce the general effect at a distance of a white pansy in a blue sky." The second and last section provides, "that the staff of the flag shall be made to represent a sleeping American rattlesnake, head downward, with an acorn in place of the head, and a white pansy bud in place of rattles, the whole symbolizing defence, courage, wisdom, strength, peace, and immortality."

Lest you should think me taking liberties with your credulity, let me hasten to assure you that I am quoting verbatim the essential features of these bills. Imagine for a moment an acorn-headed pansy-tailed rattlesnake stiffened into a flagstaff, and bearing aloft as the banner of our country this travesty of the stars and stripes, proclaiming to the world an alien flower as Columbia's emblem! Surely when this extraordinary combination was conceived western wit was wool gathering. It is perhaps needless to say that this attempt to manufacture sentiment by act of Congress did not meet with popular approval.

In the advocacy of Indian Corn a hearty American feeling expressed itself in terms of genuine culture. One of the first notes to be sounded in its praise was a stirring poem by Edna Dean Proctor, entitled "Columbia's Emblem," which appeared in the "Century Magazine" for September, 1892. In 1893 the June number of the "Arena" had a symposium of eminent persons on "Maize as the National Flower," and in the same year appeared a little volume of "Tributes in Verse and Prose," entitled "Columbia's Emblem, Indian Corn." This collection included, besides the poem already mentioned, other poetic selections appreciative of the worth and beauty of maize, extracts from American

historians showing its importance in our national development, accounts of its ceremonial use by the red men, and illustrations of attempts to use it in architectural ornament.

Since the Columbian year the fortunes of this candidate for the national flower have sadly declined. While the advocates of maize had said many interesting things about their favorite, and in a most charming way, these proved to be very little to the point. The cordial words of welcome which at first greeted their suggestion in so many quarters were soon followed by words of vigorous protest backed by fundamental objections. To these no satisfactory answer has been forthcoming, and the significant chill of silence which has followed so quickly upon the first glow of enthusiasm has been made scarcely less depressing by the occasional confessions of some more or less distinguished persons that the objections aforesaid have had no weight with them. To the credit of others, among whom are included some of the most prominent of the original advocates of maize, be it said that they have recently expressed themselves as having entirely abandoned the idea of trying to make this plant our national flower.

How shall we explain the fact that a candidate which was introduced to the public under such favorable auspices, and vouched for by such distinguished leaders of public opinion, should prove so disappointing? My answer is that those who fondly expected the public to accept Indian corn as a national flower simply reckoned without their host. In the first place, we of the people are so constituted that not even with the imaginative help of the poet can we recognize in a maize plant what we mean by a flower. Though horticulturists have developed some ornamental varieties of maize, they class them as foliage plants and not as garden flowers. If a botanist insists that it has what he calls flowers we have to remind him that in this case, then, what he calls flowers are wrapped in husks. For the purpose of decoration there might as well be no flowers at all. To us it neither has what looks like a flower nor could we without making ridiculous pretence ever manage to use the plant as a floral emblem. In the second place, it has come to our knowledge that maize is not really a native of our country.[1] While we admire many foreign plants, and are glad

[1] All recent authorities agree that maize is not indigenous outside of Central and South America. See Gray's "Field, Forest, and Garden Botany," revised by L. H. Bailey, 1895, p. 468; Harshberger, J. W., "Maize," Contr. Bot. Lab. Univ. Penn., 1893, I, 2, p. 151; DeCandolle, A., "Origin of Cultivated Plants," p. 387 *et seq.*

to profit by them in various ways, we reserve a special affection for the plants belonging peculiarly to our native land, and this affection we wish to bestow upon our floral emblem. We insist that our national flower shall belong to our national flora. A national flower which is not a flower and is not national is not the sort of a national flower that the people desire. Moreover, the adoption of this plant would not only deny us what we seek, but would force upon our minds associations antagonistic to the feelings which a national emblem is meant to inspire. This would result from the many prosaic uses of corn, which, because of their very importance, suggest our most frequent and therefore most potent thoughts regarding it. When the average man begins to realize that he is expected to be uplifted by corn-fed thoughts of country the idea is pretty sure to be greeted with a grin. Yes, the saving sanity of American humor may be trusted to keep us from mixing our patriotism with our porridge.

Before endeavoring to trace the further development of the national flower movement let us pause for a moment to review the situation presented in 1892, the Columbian year. Four noteworthy attempts had been made to satisfy the growing desire among our fellow countrymen for a floral emblem which might fitly represent the United States among the nations, and meet the requirements of national celebrations such as the one nearly at hand. Each of these attempts had failed to secure popular approval. Yet these suggestions, and the efforts directly connected with them, were the best results which the national flower movement had to show up to the time of the Columbian year.

At first sight the situation as described may not seem to have afforded a very promising outlook. Yet I believe it can be shown that, in reality, important progress had been made toward fully satisfying the desire for a worthy national flower. A few words will show what I mean.

The problem presented to our people has been an entirely new one. Other nations, it is true, have come to have their floral emblems, but each of these was, as it were, plucked in the childhood of the nation, snatched up as an unconsidered trifle by the way, and worn near the nation's heart while it braved the road of national progress; till, in later days, the little flower became a precious memento of the journey.

The same experience is not for us. Our nation was born with

the marks of age upon it. It had no childhood. Its mission was to seek in this new world the fountain of eternal youth, which has not yet been found.

There are many tokens of the road which leads to these pleasant waters, and one is a certain flower which makes the heart feel young and inspires the noblest yearnings of youth. We may not find this flower except by careful search, nor may we know it except it meet in us an answering wish. Therefore, when we hear one say, "Behold! It is the mayflower," and another, "Nay, but the golden-rod," and a third, "The pansy is the one," and yet another, "We have found it in the maize," let us be glad, for this tells us that the *search* is well begun. Let us rejoice even more to hear still others say, "None of these can be the flower; our search is not yet ended," for this gives hope that the true desire, the touchstone of success, has really come.

My parable, I hope, will interpret to you, moreover, the significance of the next stage in the progress of this extraordinary popular movement. The search for the true flower, once started, aroused in every section of the country a spirit of childlike enthusiasm which led to many supposed discoveries.

I shall not be expected, I hope, to dwell with impartial inclusiveness upon all the suggestions which issued from this Columbian frolic amid the flowers. Many of them are now forgotten, and excited but little interest at the time.

Our present purpose will be served by calling attention to a few specimens which illustrate the most significant types. As will be seen, the lessons taught by the preceding failures had not yet been learned. Certain persons who did not know or did not care that their candidates were the chosen emblems of other nations proposed that we should adopt the rose of England, the clover, recognized as the shamrock of Ireland, the chrysanthemum of Japan, or the lily, which has been so prominently associated with the history of France. Others who still thought, apparently, that our people might be induced to adopt a foreign flower not native to this country, advocated the pink, the pampas plume, and the cosmos. Of the last mentioned candidate one of the newspapers remarked: "Its only claim to nationality is that it was introduced into this country a few years ago from Mexico, by a German florist of Hoboken." The lingering fondness for a weed, even though a foreign one, expressed itself in the proposal to choose

the ox-eye daisy, or whiteweed, which figured as the symbol of the silverites in the late presidential campaign. The poetic feeling that a floral emblem should somehow be good to eat found further expression in the suggestions to glorify the peanut and the potato, while a somewhat similar sentiment urged the grateful recognition of those comfort-bringing foreigners, King Cotton and Señor Tobacco.

To many good people it has seemed that the whole matter depended merely upon personal fondness, and, therefore, as a contribution to the question, they have told the public their favorite flower, it never occurring to them that fitness for national uses should be the first consideration.

Perhaps the most extraordinary suggestion of the time was that we have instead of a national flower a bouquet or garland composed of State flowers. There were those who welcomed the idea as a beautiful compromise, calculated to please everybody. But alas! the more people thought about it the less they liked the idea. It was asked, Supposing every State to have adopted its floral emblem, how could any one ever get together the forty-five flowers, in bloom at different times? If by some wizard's spell such an incongruous medley could be collected, what could be done with it, or how could it be represented in a small space? To this question no satisfactory reply has been made. But for the comfort of those who still see useful possibilities in the idea it should be pointed out that so far as the garland could be used at all it might supplement, but could never be a substitute for, a national flower.

None of these candidates aroused more than a fleeting interest. The pond lily, the larkspur, and our native asters and sunflowers, were somewhat more favored. Asters and sunflowers won support from their wide dispersion and stellar or solar suggestion; but soon two fatal objections appeared. The first was their late blooming; the second, that their blossoms so nearly resembled those of the chrysanthemum of Japan that if used for national purposes in conventional design they would be indistinguishable from that foreign emblem, which to some we might even appear to be copying.

The larkspur was urged because of the red, white, and blue flowers of different sorts, but since there was little else to recommend it, and as in the wild state it was not very widely known, it was but little urged.

The pond lily at first recommended itself strongly by its exquisite form and fragrance and by its time of blooming; but its chances for national favor were nipped in the bud when people came to realize that its petals closed tightly in cloudy weather and at sundown, and that the famous lotus of the Egyptians (virtually their national flower) was a water lily closely similar to our own. It was in vain that one of its advocates pointed out the excellent example which the water lily set to the American people, by going so early to bed.

No little interest was aroused by the suggestions of those who sought to reinforce the growing interest in park-gardening, and the celebration of Arbor Day, by leading the popular desire for a national flower in the direction of some tree or shrub. The oak, the American elm, the magnolia, the tulip tree, the yucca, and the mountain laurel were the principal woody plants brought forward. There was not a little to be said in favor of some tree emblem, especially since Canada afforded us an encouraging example in having adopted the sugar maple. Nevertheless, although the recommendations came from high quarters, there proved to be insurmountable difficulties in the way of a wide popular acceptance of any such idea. Very few of our woody plants grow wild over the greater part of our territory. Nearly all belong to the East or the West, or grow well only in the Northern or the Southern States. The magnolia, the tulip tree, the yucca, and the mountain laurel, for example, are thus restricted in their distribution; the few trees like oaks, pines, and elms which have a wider range are unsuitable for the purposes of a floral emblem because they have no flowers possessing a decorative value. A further difficulty is that the cultivation of any tree or shrub would be scarcely possible to large numbers of our people, who derive, however, much pleasure from raising herbaceous plants. Thus it happened that another group of disappointments came to swell the list already recorded.

Surely nothing could better show the invincible vitality of the popular desire for a national flower than its persistence in spite of all these deferments of hope. Those who thought that the movement had at last exhausted itself in more or less ridiculous futility were entirely mistaken. They might point by way of confirmation to the fact that interest in such matters was being largely directed to the choice of State flowers. But this interesting outcome of the national flower movement, instead of supplanting the original

desire, in reality strengthened it, and at the same time afforded most helpful encouragement.

The problems connected with choosing a suitable State flower are much the same as those involved in a fitting choice for the Union. The main difference lies in the lesser difficulties which go with the smaller territory. It is but natural, therefore, that satisfactory solutions of the State problem should be first attained. Among the flowers which have already been adopted by legislative action as the floral emblems of their representative States the following may be mentioned: The moccasin flower, or lady's slipper, (*Cypripedium*) was chosen by the Minnesota Legislature in a resolution passed shortly before the opening of the Columbian Fair. The next year a bill was introduced into the Legislature of Montana naming the bitter root (*Lewisia rediviva*) for State flower. This bill was passed in 1895. The Columbine (doubtless *Aquilegia cærulea*) has been for some years the recognized floral emblem of Colorado. The matter is being more or less vigorously agitated in many of the other States.

In this work good service is being rendered by the National Floral Emblem Society of America through various local societies which are affiliated within it. The organization was begun at the time of the World's Fair in Chicago, and the headquarters are in that city. As expressed in its Constitution, the aim of the Society is to "obtain a genuine expression of the will of the people" which shall lead to the adoption of a national floral emblem and the selection of State flowers, so far as these have not already been chosen. It purposes through a somewhat elaborate system of appointments and committees to reach every part of the country. One of the best examples of a local branch is the Floral Emblem Society of Massachusetts. This branch, under the able presidency of Mrs. Ellen A. Richardson, has for the past few years been affording opportunity for the advocates of various flowers to present their claims at its meetings. It has also striven to win for us a more rational and edifying celebration of the Fourth of July, and has devoted itself to various other patriotic and educational concerns.

Entirely independent, although in friendly relations with the Floral Emblem Society, is the Columbine Association, which today holds a leading place in the national flower movement. The fortunes of the Columbine Association since its beginning in 1895 have been so closely linked with the progress of the general move-

ment that the history of the one is largely the history of the other. Yet what the Association is accomplishing has come through the concentration of its efforts upon the single aim "to bring about the final adoption of the Columbine as the national flower of the United States."

To trace the development of the columbine idea from its beginning we must go back to the Columbian year, when the search for a national flower was being pursued with keenest interest in view of the approaching celebrations. When every one's thoughts were so largely occupied with matters Columbian it was most natural that the columbine should occur to some of us as being a flower especially appropriate for Columbia's emblem. Once in mind, the idea was found to possess remarkable possibilities which have been unfolding ever since. It is significant that the idea came to several different persons quite independently, at about the same time. In the West, as we learn from recent information, this candidate was suggested by M. Sears Brooks in the Madison "Courier," of Madison, Ind., for Aug. 1, 1891. The principal arguments there advanced in its favor are as follows: "Whenever a flower has been adopted by any country it has been because of some symbolic meaning. Not merely that it was beautiful, but that in some way it represented some historic event or exhibited some characteristic quality. We have such a flower in the wild columbine. First, because it wears our national colors, red, white, and blue. Growing in every section of our country, its color at the South is more often blue; at the North it is white, while in this locality it is red with a golden interior, typical, it would seem, of the blood and treasure expended to secure the Ohio valley to an English-speaking people. The name 'Columbine' is derived from the same Latin word as is the name of Columbus, the discoverer, and of Columbia, which our nation rightly bears.

"Botanically, the wild columbine belongs to the genus *Aquilegia*, whose name is derived from the Latin *Aquila*, or the eagle, ever regarded as the emblem of dignity and might, and adopted as our national emblem. From these facts we see established a symbolic claim for the wild columbine to which no other flower can pretend.

"In its typical character we see that it grows and thrives under the most adverse circumstances. It dances just as gayly upon the bare rock, with no visible sustenance save sun and air, as in the

highly cultivated garden, its only change under culture being a multiplicity of trumpets, one within another, to sound the praises of a free and glorious country. It has all the delicate beauty and power of endurance belonging to American womanhood; all the courage and hardihood of America's noble sons. Even in decay there is no shabbiness; the trumpet-shaped petals fall singly, one by one, beautiful to the last, leaving the central shaft which they protected fruitful with seed for coming generations.

"Graceful in poise, under no circumstances becoming a noxious weed, wearing an air of prosperity as it swings its tiny bells from the crevices of bare rocks, what more can be said of any flower as the emblem of American Independence and Thrift?"

In the East the first public announcement of the idea, so far as I am aware, was by Isabella Carter Rhoades in a poem which appeared Jan. 16, 1893, in the Springfield "Republican," under the title "The Columbine for Columbia." The words of the poem were written to go with our national air, "Columbia, the Gem of the Ocean." They are as follows:

"Emblazoned in panoply regal,
The rose and the lily may shine;
Aquilegia, akin to our eagle,
We claim thee, O wild columbine!
Through Commonwealths five and twice twenty
And States yet in embryo, too,
Scatter widely thy symbols of plenty,
Cornucopias red, white, and blue!

"Thou art red as the East flushed with glory,
Deep blue as the warm Southern skies,
Snowy white as the North's hilltops hoary,
In the West, like its own golden prize.
Ring airily out on the mountain,
Swing slowly thy bells on the plain,
By prairie and cañon and fountain
Elfin fingers wake Liberty's strain!

"Be our lives like thy leaflets well rounded,
Holding truth as their hearts hold the dew;
May our Union, for Liberty founded,
Nurture Justice and Purity too.
O country with future so glowing,
The nations still watch thee afar!
Portion wisely the plenty o'erflowing
From the horns that encircle the star!"

In the "Home Magazine" for March of the same year T. T. Swinburne is quoted by a writer on "The National Flower" as advocating the columbine for reasons similar to those suggested by its earlier champions. By a curious coincidence there appeared at the same time in the "Household" an article by the present writer, entitled "Our National Flower," in which substantially the same arguments, along with others, were set forth.

Finally Harlan H. Ballard, the President of the Agassiz Association, without being aware that the columbine had already been suggested for our national flower, wrote in the "Journal of Education" for April 2, 1896, as follows: "Let us leave the roses white and red with passion to wither on the dusty pages of England's history, but let us adorn Columbia's brow with the columbine, that breathes of dove-like peace."

The conviction that the columbine was the flower of flowers for Columbia's emblem came also quite independently to other persons who made no public announcement, and we shall not be surprised to learn that other original expressions of the same idea have been made in public, besides the five at present known to us. That the same idea should have come to so many at about the same time is an interesting proof of its inevitableness in view of our allegiance to Columbia. The desire to have the columbine as our national flower may be said, therefore, from its origin at this time, to have been a direct outcome of our Columbian anniversary.

The rapidity with which the columbine idea won adherents seemed to confirm the hope that the magic flower, so long sought, had at last been really found. But many another flower had seemed for a while to be the true one, and the task of testing the columbine's qualifications had only begun. But so strong was our faith in the columbine that a few of us, its early advocates, felt impelled to undertake this task.

Our method of procedure was to bring to the attention of leading Americans, representing many diverse walks of life, the main arguments for our candidate, and to ask for their opinion regarding its fitness as viewed in the light of their special experiences. For opinions as to the columbine's horticultural possibilities we went to horticulturists; for proof of its artistic fitness, to authorities on decorative design. And so with the other aspects in which a candidate for the national flower should show itself well qualified. A

few examples will show the character of the encouragement received at that time.

Surely no one could speak with higher authority regarding the horticultural merits of the Columbine than the late Francis Parkman, for three years the honored President of this society. It seems especially appropriate that I now for the first time take advantage of his permission to publish in full the following letter:

50 Chestnut Street, March 25, 1893.

Mr. Frederic LeRoy Sargent:

Dear Sir: I have read your interesting paper in the "Household" which is by far the best I have seen in relation to our national flower. Some of your suggestions are very striking and you have won me over to your belief that the columbine is the best choice we can make. I have always been partial to it on its own merits and have raised many hundred seedlings from its different varieties.

It is within the reach of the most modest purse, as it is best raised like the pansy from seed.

Some of the hybrids of *Aquilegia chrysantha*, *A. cærulea*, etc., are of remarkable variety and beauty and do not require any artificial process of fertilization, as when planted side by side they mutually fertilize themselves.

For my part, in spite of one or two brilliant exceptions, I think that the American long-spurred varieties are by far the best of the genus.

Yours very truly,

(Signed) F. Parkman.

Other communications received, and statements in seed catalogues, showed that the columbine idea was being welcomed likewise by professional horticulturists. One of the most significant instances of this practical approval came from Mr. Jacob W. Manning, who took a prominent part in the planting of the grounds at the Columbian Exposition. This gentleman having expressed himself as thoroughly in favor of the columbine for the national flower, we were moved early in 1893 at the instance of Mr. R. T. Jackson to suggest the desirability of making as full use as possible of this plant in the coming displays, if provision had not already been made to that end. We received the gratify-

ing reply that this idea had been anticipated in the plans, and that the columbine would figure conspicuously among the herbaceous plants at the World's Fair.

As evidence of the esteem in which American columbines are held among foreign floriculturists we find that George Nicholson, justly recognized as one of the foremost horticulturists of the world, says in his great "Dictionary of Gardening": "Too much praise can scarcely be lavished upon this elegant genus of plants." Moreover, it is of interest to note that of those species which he especially recommends by "starring" a majority are indigenous to our country. Sir William Hooker, than whom no botanist has ever had a wider acquaintance with the flowers of the world, said of one of our Rocky Mountain species, *Aquilegia cærulea*, "In my opinion it is not only the queen of columbines, but the most beautiful of all herbaceous plants."

In matters botanical we have depended mainly upon statements which have come from the botanists of the Harvard Herbarium. Dr. Gray's "Synoptical Flora of North America," as continued under the editorship of Dr. Robinson, recognizes thirteen species of Aquilegia indigenous in the United States. That there are just thirteen is interesting as a coincidence, in view of the thirteen stripes in our flag, commemorative of the thirteen original States. From this same work we learn that the territory throughout which these native columbines range embraces every State in the Union except perhaps those which border on the lower Mississippi. This remarkably wide distribution is indeed almost without parallel among our native plants, if we except certain weeds.

Fig. 1. — Side view of Rocky Mountain Columbine and a single petal detached.

Figures 1–3 will serve to recall the main types of general form assumed by our native columbines. Figure 1 shows the general form in such species as *Aquilegia brevistyla* and *A. saximontana*, both of the Rocky Mountains, and so closely similar to the common columbine of the gardens (*Aquilegia vulgaris*) that when first discovered they were

deemed by botanists to be merely varieties of that Old World species. Dr. Gray recognizes five American species of this type; and the latest works inform us that the *A. vulgaris* itself is now frequently found growing wild in the Eastern and Middle States.

Fig. 2.—Front view of Rocky Mountain Columbine.

It was to this short-spurred type that the names Columbine and Aquilegia were originally applied. The latest dictionaries confirm the view that columbine comes from the Latin *columba*, dove, and was given to the flower because of its resemblance to a group of doves. The same authorities state that Aquilegia is from the Latin *aquila*, an eagle, most probably because when the flower is reversed the curved nectaries suggest the five talons of an eagle's claw. Of straight-spurred forms we have seven species, as follows: the small, red-flowered *Aquilegia Canadensis*, which is the one most familiar in this region; two very similar to this in the far West; another, *Aquilegia cærulea*, with blue, lilac, or white flowers, often three inches broad and with spurs two inches long; and three, including *Aquilegia chrysantha* and *A. longissima*, with golden or pale yellow flowers, having nectaries like horns of plenty, ranging from one to six inches long. The flowers of all our

Fig. 3.—A Western American Columbine.

species present in front view the outline of a beautiful five-rayed star, immediately suggestive of the stars of our star-spangled banner. The time of flowering for the whole country is given as extending through the spring and early summer. Thus, as will be seen, columbines are available on our only national holiday, namely, the Fourth of July, which is celebrated in every State; and are at their very best on Memorial Day, when we have most use for a national flower.

Fig. 4. — Leaf of Eastern American Columbine.

It was felt that from the point of view of decorative design the columbine must possess great advantages, from the fact that its national associations were expressed not only in its name, but in the form and colors assumed by the various parts. Accordingly, this aspect of the flower was brought to the attention of professional designers, and search was made for actual examples of its use in decoration. Only a few of the most interesting results can here be given. Mr. C. Howard Walker, lecturer on Architecture

in the Boston Museum of Fine Arts, and on the History of Ornament in the Massachusetts Institute of Technology, wrote us as follows: "The columbine is the only one of the competitive flowers which is symbolic and can be used decoratively in all its parts. I wish that the public could appreciate the advantage of the choice of a flower which frankly shows its arrangement upon a geometric scheme, and of which the parts are sufficiently simple to be clearly defined, and which also is to be found in more than one color."

We were interested in having our attention called to the fact that John Ruskin in his "Elements of Drawing" chose the leaf of the columbine as an especially happy illustration of the organic beauty which is attained through a well-ordered subordination of parts. His drawing of the plan of the leaf is significant also as showing that the terminal segment is composed typically of thirteen lobes. Thus we see that the leaf as a whole, with its many leaflets of many forms harmoniously related, would remind us of our motto, "*E pluribus unum*," while the terminal group, the leader of them all, would suggest by its subdivision the thirteen original States whose preëminence in the Union we symbolize by the thirteen stripes of our flag. See Fig. 4, Leaf of Eastern American Columbine.

An examination of designs taken from illuminated manuscripts showed us that both the leaf and the flower of the columbine have long been favorite motives with designers. In the decorative work of William Morris, that prince of modern designers, we have found repeated examples of the columbine figuring as a leading element. American designers are just beginning to realize what a treasure of decorative possibilities they have in the American forms of this flower.

American poets we found had long shown a loving appreciation of its charms. It may be safely said that no other of our native flowers has received such tender tributes of affection from so many of our foremost poets. Sometime we hope it may be possible to publish the considerable collection which has already been made. A few short examples must here suffice. Ralph Waldo Emerson says:

> "A woodland walk,
> A quest of river grapes, a mocking thrush,
> A wild rose or rock-loving columbine
> Salve my worst wounds."

In these verses of Elaine Goodale see how vividly its wild grace has been felt:

"Skirting the rocks at the forest edge
With a running flame from ledge to ledge,
Or swaying deeper in shadowy glooms,
A smoldering fire in her dusky blooms;
Bronzed and molded by wind and sun,
Maddening, gladdening every one
With gypsy beauty full and fine,—
A health to the crimson columbine!"

No one of our poets has ever helped us more fully to feel the quickening spirit of nature than Jones Very. By many of us his utterances have been treasured as among the choicest outcomes of New England culture. It becomes, therefore, of especial significance that of his collected poems five should be on the columbine. From this wealth we must make a small selection. First, as showing something of the range of thought which this flower suggests, let me quote from his sonnet written about twenty years ago, "On some Blue and Golden Columbines from Pike's Peak, Colorado":

"O new-born State, what lovely flowers are thine!
Differing in color, but in form the same,
From mountain heights has come thy columbine,
Which shares with ours in beauty and in name.

"Our youngest State may grander scenes disclose,
Far loftier mountains, parks and vales more fair;
Yet where the columbine on hillside grows,
Strange though the scene, one heritage we share."

Finally, in "The Return of the Columbine," he speaks thus of the form familiar to him from childhood around his native home in Salem:

"In every crevice thou findest a place
With beauty the rocks to adorn;
The dark, craggy hillside thou lovest to grace
With bright hues like the colors of morn.
And the children come o'er the hills to roam,
And gather in bunches thy flowers;
Sweetest tokens they are, in many a home,
Of their walks, and the glad summer hours.

"Oh, would that the beauty so lavish and free,
And that doth with each season return,
We might with the glad heart of childhood see,
And the lesson it brings for us learn!"

These lines I have quoted especially to recall to your minds the peculiar affection which American children have for columbines. It is preëminently the children's flower, as other poets have told, and as I feel sure the experience of all of us will testify. We have had men and women from every section of the country tell us that there is no other plant which has such power as the columbine to call up the happiest times of their childhood.

These assurances confirmed our belief that at last we had found the magic flower which grows by the road to the fountain of Eternal Youth, wherein is mirrored our nation's true ideal. The columbine had shown its power to make the heart feel young. If our country's name and its mission of peace, if the hallowed symbols on our flag and coat of arms, if an example of dauntless freedom beckoning from the heights of highest achievement, can move us, then will the columbine yield the inspiration which we need. By all these tokens it is Columbia's flower. The road along which it would lead us passes through the bewildering woods where wanderers are lost; yet, by the flower's guidance, we should climb up the rugged sides of the everlasting hills, until, high above obscuring forms, we stand erect on freedom's summit, and feel the continent at our feet. There we should find the columbine, our pioneer, expanding its dove-like wings above the eagle's nest.

Such was the faith, which time only strengthens, in those who founded the Columbine Association. We were a small company, yet believed that success would be given to our feeble efforts, where so many others had failed. We believed this because we no longer could doubt that an important message had come to us to proclaim, and by our love of country and our country's fairest flowers we were bidden to say it forth as best we might.

In the autumn of 1895 a preliminary organization was effected, and by the following spring the Columbine Association was fully established. Since then its affairs have been managed by a governing board consisting of three officers and a council of twenty-one members. In this council are men and women especially competent to advise in the various artistic, literary, horti-

cultural, botanical, educational, and other questions touching our special work. Among these persons are several members of the Massachusetts Horticultural Society. Although the Columbine Association came before the public less than three years ago it has already about three thousand members. These represent nearly every State in the Union. The fact of this rapid increase will, it is thought, lend interest to a brief statement of our plan of work.

Our principal publication is a leaflet stating concisely our arguments and methods. Copies of this, each accompanied by a membership application blank, have been widely circulated by the Association, at a price fixed so as just to cover cost.

Our constitution provides that "The object of the Association shall be to bring about the official adoption of the columbine as the national flower of the United States. To this end, the Association shall undertake to circulate as widely as possible information regarding the unique qualifications of the columbine for Columbia's floral emblem, and in other ways to arouse and direct the interest of our fellow-Americans in this important matter. As soon as the membership shall have become sufficiently extensive to warrant such a step Congress shall be memorialized, and a petition be presented which shall urge the formal recognition of the columbine as an emblem of the Nation."

It is further provided that "membership in the Association shall be open to all, and all shall be welcome," and that "an initiation fee of ten cents shall be required." This small fee barely covers the actual cost of the printed matter sent to the member, which includes two copies of the leaflet, each with its application blank, in order that the member may begin at once to secure new members. Up to this time the profits have been insufficient to permit any free distribution of the Association's publications. No one concerned in managing the affairs of the Association receives any remuneration for his services. All money coming into the treasury is expended entirely for the benefit of the cause.

The most effective means of spreading the glad tidings of the columbine's possibilities has been simply the passing on of the message from one person to another; from this one to a third, and so on and on. But much help has also come in other ways. Various lecturers in different parts of the country have made it their theme. Patriotic and literary societies have chosen it as a

subject of discussion. Not a few of the leading newspapers and magazines all over the country have given their approval and the help of their columns to our candidate and our work, although these same papers had seemed to be unable to take seriously the previous efforts towards securing a national flower.

The quarterly known as "Poet-Lore," the leading magazine of its class in the country, has adopted for its cover a columbine design.

The managers of several charitable fairs have found that a "Columbine Booth" proved a most remunerative novelty. At one of the great fairs given in Boston last winter arrangements were made not only for a Columbine Booth presided over by Miss Columbia, but for a representation of the golden-rod and the Indian corn at other tables. At each the visitors were invited to vote for the flower of their choice, at five cents a vote. At the close of the fair it was announced that the Columbine had received far more votes than the other candidates.

Some of the very best work has been done in the schools. Since nothing can show so well the inspiring power of the columbine idea as its possibilities in the hands of teachers I wish especially to call your attention to a few examples of what they have accomplished. Miss Ida Thayer Weeks, of the Tileston Grammar School, at Mattapan, writes as follows: "In all my experience I do not remember the children so absorbed in anything as they were in this. I talked with them a bit first as to a national flower, what it was, why we should have one, the flowers of other nations, etc., and then I read the leaflet, stopping all along to explain or discuss. The greatest proof, however, which I can give of their interest lies in the fact that when I suggested (in fear lest I should dampen their enthusiasm) that each should write a composition on the subject, not one face fell. Any teacher will understand what I mean, I feel sure. Each has illustrated his writing with pen and ink sketches, but, best of all, each has designed and painted a suitable cover for it. Crude art it is, but done with a most loving spirit." The children's columbine designs, accompanying the letter from which I have just quoted, represented the work of all the class.

To those who are familiar with children's attempts at decorative work it has been a matter of surprise, in looking at this series, that so much individuality and variety are shown. The usually

numerous examples of copying one from another are looked for almost in vain. While, of course, the same elements are used by all, they are managed in strikingly different ways. We cannot account for this except by supposing that the various forms of the flower so appealed to these children, and so invited them, that each felt at once something of the joy of independent invention, and had no need to imitate. From a flower with which unskilled children can do so much we may fairly expect a far more interesting treatment at the hands of professional designers than they have shown themselves capable of giving to the other flowers which have been advocated.

Indeed, the columbine has already formed the subject of some admirable designs besides the ones to which we have already referred. One of the most attractive of recent wall papers is composed of bunches of columbines. Many will also remember the very popular Columbine Calendar which Messrs. L. Prang & Co. produced for 1897. This proved to be so much of a success that a more elaborate one is in preparation for next year. It should be noticed in passing that with these professional designs, even when most conventionalized or lacking in color, it has not been considered necessary to affix a label.

Another way in which the columbine idea has been of help in the schools is by affording a leading feature of the school exhibitions. At the Tileston School the graduating class already mentioned presented as the principal exercise on the programme an animated discussion of the National Flower question, which had been prepared in dialogue form by their teacher. The published reports show that this feature made the occasion one of unusual interest. For the benefit of other teachers this discussion was published in the "Journal of Education" for March 25, 1897. We have heard, also, of its successful use in other schools; notably, in the Pierce Grammar School in Brookline, at the graduating exercises last June. Added interest was gained by having the other numbers on the programme chosen with reference to the general subject, namely, "National Emblems correlated with History, Literature, Music, Drawing, Latin, and French."

This work in the schools we feel to be of especial importance, since the main purpose of the Columbine Association is an educational one. But, as we have already seen, there are plenty of men and women not yet too old to welcome the message we have

to declare, if once they might realize its true meaning. The chief hindrance to many who would otherwise be friendly to our cause is that they do not see clearly just what sort of a plant would fully satisfy their desire for a national flower. We were much helped in our effort to reach these people by the opportunities offered at the National Flower Convention, held at Asheville, N.C., Oct. 21–23, 1896. This convention, called to recommend a national flower for adoption by Congress, was composed of delegates from various States of the Union, chosen by their respective governors, at the request of Governor Carr, of North Carolina. The two delegates and the two alternates from Massachusetts were, through the kind offices of the Secretary of this Society, selected from the governing board of the Columbine Association, and included its President and its Secretary and two members of its council. At the convention the President of the Columbine Association was elected to preside. To the Secretary of the convention, Mr. Edwin A. Taylor, belongs the credit of the original idea of thus bringing together officially accredited representatives of the different States, and to his self-sacrificing and untiring energy was due the final accomplishment of an undertaking unique in the history of our country. Delegates representing a majority of the Eastern and Middle States were present, and a few from the South and West, but it was found impossible at that time to secure the attendance of those from the more distant States. This was largely owing to unfortunate circumstances attending the presidential campaign. Thus the absence of many of the governors on campaign business made it impossible for them to give due attention to the appointment of delegates, and, indeed, a matter affecting so little the great political questions of the hour would naturally give place to more pressing concerns. But, in spite of the fact that a majority of the States were not represented, the deliberations of the convention advanced the national flower movement in important ways. The main result is set forth in the following official letter:

"His Excellency Elias Carr, *Governor of North Carolina:*

"Sir: We, the undersigned, have been appointed a committee by the National Flower Convention, assembled by your invitation in the city of Asheville, the 21st–23d of October, 1896, to apprise you of the results of their deliberations.

"In regard to the main object of their assembly, viz., to decide upon a flower to be recommended in a memorial to the National Congress for adoption as our national floral emblem, they have concluded, after careful consideration, that in view of the inadequate representation of the different sections of the country it is inexpedient to make any recommendation at this time.

"In the way, however, of contributing to the decision of the matter sometime in the near future they have thought it not improper to present herewith a copy of the resolution adopted by them at their first business session for their own guidance in the selection of a proper floral emblem, viz.:

"'*Resolved*, That a plant to serve properly the purposes of a national flower should meet the following conditions:

"'1. It should be a native of the United States, and should grow wild over the greater part of its area.

"'2. It should bloom on one or more of our national holidays.

"'3. It should be capable of easy cultivation in any garden.

"'4. It should not be a weed, or in any way offensive, or harmful to health.

"'5. It should bear what in the popular sense is called a flower, and should not be merely a foliage plant or one chiefly valued for its fruit.

"'6. It should lend itself readily to floral decoration by variety and purity of color and distinctiveness of form.

"'7. The features characteristic of its form should combine such simplicity and gracefulness that, when used conventionally in decorative design, the flower may be readily recognized independently of its color.

"'8. It should be a flower which has never been used by any other people as their floral emblem, and not resemble such a flower in general form.

"'9. It should possess, if possible, patriotic associations plainly connecting it with the best for which our country stands among the nations of the world.'

"While the convention deemed it inexpedient to make any recommendation of a special flower at this time it was evidently the sense of a majority of the delegates present, as shown by an informal vote, that the Columbine, or Aquilegia (sometimes known

as Wild Honeysuckle) is the only flower which meets the requirements set forth in the above resolution.

"We have the honor to be,
"Very respectfully yours.

(Signed) "Frederick LeRoy Sargent (Massachusetts),
"W. N. Geddes (Pennsy vania),
"C. F. Currie (New Jersey).
"L. Chaille Jamison (New Orleans),
"Henry Holzapfel, Jr. (Maryland)."

In judging what the convention accomplished it should be borne in mind that this was the first attempt ever made formally to submit the question of a national flower to a deliberative body of representative men and women officially chosen for the purpose. The first and most important step toward a satisfactory solution was an agreement as to the qualifications which should decide the fitness of a flower to be our national emblem. The great need was a clear expression of fundamental principles upon which future discussion might profitably proceed. So fully was this need met by the resolution quoted above that we have yet to hear of any one who calls in question the entire justice of its provision. The convention, in refusing under the circumstances to go further than this and try to hasten the final decision by a recommendation to Congress, was influenced solely by the consideration that the whole country would not be fairly represented by their votes, and that therefore the true progress of the national flower movement would by such action be more retarded than advanced.

It is announced in a recent Asheville paper that arrangements are making for a second National Flower Congress, to be called by President McKinley at Washington, D.C. We await with interest further details from official sources.

As a further outcome of the Asheville Convention there has recently been started by Mr. Edwin A. Taylor an independent society known as the National Flower Council. Its headqnarters are at Asheville, N.C. Some of its forms of procedure are closely similar to those which have proved so successful in the Columbine Association. A fundamental difference is in the fact that the National Flower Council claims no special interest in any one flower.

The Columbine Association has been scarcely less fortunate in the opponents it has aroused than in the friends who have rallied to the cause. There is no better test of the strength of an idea than its power to meet gainfully opposing ideas. When, as often has happened, opponents of the Columbine Association have been converted into friends their applications for membership have been none the less welcome. At the risk, therefore, of encroaching on the time allowed for after-discussion of the lecture I trust I may be permitted to state the substance of the worst objections which the advocates of the columbine have encountered. If there are present any of our friendly opponents, perhaps they may be introduced to some aspects of the matter which had not occurred to them; and if in the short time remaining at my disposal I shall be unable to answer to their satisfaction all the objections which have occurred to them I trust that opportunity will be afforded for considering their views more at length.

To facilitate our quest for truth let us imagine an attorney for the remonstrants, who shall have been entrusted with all the correspondence and newspaper clippings belonging to the association, and shall have been otherwise empowered to find out all the adverse criticisms which have come to our ears. We promise that he shall be no man of straw, but shall quote the most damaging evidence he can find.

He begins: A prominent horticulturist of this State expresses the feeling of not a few thoughtful persons when he says that to him "a floral emblem seems superfluous and not a thing to legislate into existence."

We reply: As regards the importance of our having a suitable national flower this present meeting is proof that the leading horticulturists of Massachusetts now hold an entirely different view from that expressed by the gentleman quoted. Furthermore, it shows that by inviting to this lecture other thoughtful people of the community it gives them credit for believing that some importance is to be attached to a matter which touches the public sentiment of this and of future generations, and must affect the opinion which foreign nations are forming of the good taste of our people. Perhaps the gentleman himself has now changed his mind. If he admits that we have reason to be glad and thankful for the beauty and significance of our flag and coat of arms, which make them admired throughout the world, then he stands

committed to the belief that future generations would be grateful to the people of today for the adoption of a floral emblem which arouses the same inspiring sentiments by the language of living beauty — a symbol of symbols, not made with hands. He will not then deem that a superfluous thing which permits our writers, artists, teachers, and our people everywhere, to remind us of our country's highest ideals in an endless variety of beautiful ways not possible by our present heraldic means. If the gentleman had lived in the early days of our country, would he have advised Congress not to legislate into existence such a thing as a flag and a coat of arms?

Our objector continues: What you ask regarding our flag and coat of arms receives an answer much to the point in an opinion expressed by a governor of one of the New England States. The American eagle and the stars and stripes for which he gallantly fought afford all the emblems he wants for patriotic purposes, and he is jealous of anything that might stand as a rival to "Old Glory" and "The Bird of Freedom." A flag is a military necessity; a coat of arms a requisite of government; a national flower is neither. As to the use of such an emblem on postage stamps and the like he prefers to have, as now, the heads of Franklin, Washington, or other great Americans, rather than any floral design.

We reply: The governor misses our intention by supposing that we expect the national flower to compete in any way with our other cherished emblems. This could never happen with us any more than it could with other nations having national flowers. The rose of England does not join in the fight of the lion and unicorn for the crown. The rose with the shamrock and the thistle modestly offsets the grimness of this animal belligerency by touches of significant beauty. Witness the use of these flowers on the jubilee stamps of Great Britain. In this interesting series of postal designs the main feature of all is, of course, very properly a portrait of the queen, while the surrounding ornamentation is much enriched by the introduction of conventional representations of one or more of the flowers mentioned. The designs of our present postage stamps would lose nothing by the addition of the columbine as a subordinate element, and they would gain both in beauty and significance. If our flag is a necessity of war the columbine as an emblem is a necessity of peace. Neither can

truly be said to be entirely indispensable, but both are invaluable as means of inspiring effort to patriotic achievement. Each is fitted to serve its special purpose better than anything else possibly could. We need the columbine for our emblem of peace. Nothing else can so fitly express Columbia's mission as the prophetess of peace, the peacemaker of the nations. No other emblem can hold so persuasively before the people that Christian ideal which prompted our great warrior to say, "Let us have peace."

Again our opponent speaks: We deny that the names of your plant upon which such stress is laid have the significance which you attach to them. Columbine means column-binder, and Aquilegia, according to Dr. Gray's latest work, is from the Latin *aquilegus*, water-drawer, the derivation from *aquila* being, as he says, "an invention."

We reply: These objections might be important if true. It was a long time before we could track that "column-binder" idea. None of the great dictionaries or the special books on plant names even so much as referred to it. They were found to be unanimously of the opinion that columbine comes from *columba* (a dove), of which *columbus* is the masculine form. Finally in an old edition of Stormonth's dictionary we found that after showing how it came through the old French form, *columba*, a dove, he adds, "may be only from *column* and *bine* from Anglo-Saxon *bindan*, Icelandic *binda*, to bind, as in 'woodbine.'" and then tells us that the plant he is talking about is *Aquilegia vulgaris*. This plant is not a vine, and no one ever knew it to bind anything unless perchance it be the hearts of those who love it. All the writers best qualified to judge of the matter evidently consider that Stormonth ought to have known better than to make such a wild self-contradictory guess. Those who have been worrying over Dr. Gray's remarks on the derivation of Aquilegia will find comfort in its correction recently published in the second fascicle of the first part of the first volume of the "Synoptical Flora." On page 463 we read: "Aquilegia. The etymology of the generic name is at best doubtful." The Columbine Association has never claimed otherwise. Our statement from the first has been simply this: "However the name may have originated, it has generally been understood by generations of those who have used it to be connected with the Latin *aquila*, an eagle." For proof of this we have the statements of innumerable writers on plants for over one hundred

and fifty years. This long-established association of ideas no one can doubt. The fact that no one really knows how the name Aquilegia came to be given to the columbine is not of the slightest consequence from our point of view. We are not concerned with the unknown beginnings of the name, but with the vital association which it has come to have and can never lose.

The objector returns to the charge: What you say about these names may be true enough, but how about the specific name, *Canadensis*, which botanists have given to our Eastern columbine? Is not this name with its Canadian significance most unfortunate? We reply: On the contrary all that is unfortunate about it is that so few of our people have ever heard the plant called by that name, and that so many of those who have heard it do not know what it really means. The history of the name is briefly this: Linnæus, the "Father of Botany," gave the plant this name in 1753, borrowing it from Cornut's "Canadensium Plantarum." In those days the region called Canada, as is well known, extended from Quebec to New Orleans. The name *Canadensis* could only mean that the plant grew in this immense region, of which by far the greater part now belongs to the United States. Not a few of the other plants which received the same specific name at that time are never found in the present Canada at all. Many of us are glad to feel that our familiar wild columbine does grow in the Canada of today, for we take it as perhaps prophetic that some day when the columbine's message shall have made Columbia's sway a wider blessing the little plant will no longer be growing on an alien soil.

The anti-columbinist continues: Among the popular names and fancies which have become associated with the columbine there is one which makes it ridiculous; it is called "folly's flower." An early American poet, William Young, speaks of "the columbine with its cap and bells for folly." Mr. Meehan quotes from Miss Twamley to the same effect, and says that even Shakespeare refers to this flower in connection with folly.

We reply: What you say may have some value as a joke, but a sense of humor must prevent any one from taking it seriously as an objection. In the first place it is not true that Shakespeare refers to this flower in connection with folly. Mr. Meehan is entirely mistaken. The two obscure writers whom you mention seem to be about the only ones whose thoughts have turned in

this direction. To them, however, we have reason to be grateful as adding one more to the quaint conceits which this flower has suggested. It has been well said that we love those persons best at whom we may now and then have our little laugh. The principle applies here. This suggestion which leads us to see the cap and bells in the columbine and so make of it a little jester affords an affectionate touch no less welcome than quaint. Our beloved Lincoln, whom Lowell calls "the first American," would have been less truly so without his jokes. So in the columbine — if there was one feature lacking to make it truly representative of all that is best in the American people it was a suggestion of the characteristic American humor. This is now given us in the reminder of the cap and bells, the badge of those invaluable representatives of freedom of speech called fools, perhaps because they were generally the wisest and wittiest men of their day.

Again the opposition speaks: Many complain that our wild columbine is too frail to be useful for decoration, and some urge furthermore that to choose it for a national flower would be to encourage its extermination.

We reply: Wild flowers are very seldom as satisfactory for floral decorations as cultivated ones; hence our need of florists and horticulturists and our gratitude for their achievements. No one who has seen the magnificent exhibitions of cultivated columbines in this hall can fail to recognize them as having all the qualifications necessary for decorative purposes. Like roses they need to be carefully handled, because of the delicacy of form which is an essential condition of their exquisite loveliness. So cared for they are durable enough — more durable than many flowers more widely used — and as durable as the loveliest flowers ever can be. If for any one who shall desire to use columbines on national holidays it shall not have been practicable to raise or to buy them the wild ones will generally be available in the vicinity, and if treated with becoming tenderness will prove a joy far more lasting than the critics would have us believe. Experience has shown that a bunch of wild columbines carefully tended will remain fresh in a vase of water for nearly a week. As to any real danger of exterminating such a plant, it is quite imaginary. For in the first place not only is the plant difficult to uproot, and in certain cases inaccessible, but the free seeding of these individuals insures a good supply of new plants. Moreover, if the columbine should

once become our national flower its rights would be more jealously guarded than ever, and more efforts would be made to sow seeds wherever they would grow. It is not the least of the services which the Columbine Association is rendering to lovers of our wild flowers that it seeks to make two columbines grow where but one grew before.

Our antagonist resumes: You say that Colorado has already adopted a columbine for its State flower. Does not this preclude its use by the country at large?

We reply: Not at all. Colorado's view of the question is well shown by the fact that Governor McIntire of that State is a member of the Columbine Association, and has written us his hearty approval of our plan. If other States should wish to adopt the columbine as an emblem they would of course need to choose some other sort sufficiently distinct from the Colorado one to avoid heraldic conflict. But between the United States and any single State there could never be any such conflict. This is illustrated by the way in which the American Eagle and the Stars and Stripes of the National shield recur again and again in the arms of the various States. Instead of a conflict of emblems the result is expressive of a further bond of union of the parts within the whole.

The counsel for the remonstrants regrets that the time occupied in answering his arguments has already been so much as to prevent him from entering several other protests that he had prepared. Rather than tax your patience further, however, he is willing to rest his case on the following general objection: The advocates of the columbine contend that their candidate is not only the most suitable flower for the purpose, but that it is the only one that can answer the requirements. How can any one be sure that the vast flora of this great country does not include some other flower than the columbine far better suited to our national needs? The great difficulty of answering such a question should make us pause, and indeed call for an indefinite postponement of judgment.

We reply: The question is fair enough, but the difficulty of answering it has been much overstated. Either of two methods will serve. The first was employed by Mr. Geddes, botanical editor of the "Standard Dictionary" and delegate from Pennsylvania to the National Flower Convention. Without prejudice he took Dr. Gray's "Manual of Botany" and went through every plant family, throwing out by a process of elimination all those plants which for

obvious reasons were quite unfit for our national flower. As a result he had just one plant left, the columbine. Moreover he assured us at the convention that before this he had not heard the columbine suggested as a candidate. Any plant not included in Gray's Manual would of course be unknown throughout the most populous sections of the country, and therefore entirely hopeless as a candidate for national flower. The second method is easier. It merely requires one to remember that many persons of all classes in all parts of the country have been doing their best for ten years to have every possible candidate considered, and that especially qualified representatives met to consider deliberately the question of a national flower from every possible point of view. There is no room for the slightest doubt that these delegates as a body were well acquainted with every plant in which the general public could have any interest, and which therefore could for a moment be considered as a candidate for national honor. Of all the flowers mentioned at the convention only one — the columbine — could meet the requirements which the convention deemed indispensable in a national flower. Hence — and the conclusion is inevitable — the equal or the superior of the columbine for Columbia's emblem does not exist. Doubtless the Creator could have made a fitter flower, but, doubtless, He never did.

Before closing, let me very briefly summarize. Each of the columbine's rivals, though precluded, as we have seen, by fatal objections from serving as Columbia's emblem, nevertheless offered some most valuable qualification. Thus, as the columbine connects itself by name historically with Columbus and the Columbian Exposition, so the Mayflower, by its name, recalls the good ship of the Pilgrims. For their widespread distribution, golden-rods, asters, and sunflowers are remarkable as well as the columbine. The golden or the purple tints of these flowers at their best match the columbine's pure yellow and purple, while the latter's near relative, the larkspur, includes among its colors the columbine's red, white, and blue. For inoffensiveness, charm, and ease of cultivation the pansy and many of the old-fashioned garden flowers have endeared themselves as much as the columbine, and for availability in decorative design it may be claimed that such flowers as the mountain laurel and the magnolia are in form hardly less exquisite and distinctive. The valuable suggestion which keeps in view our dependence upon the trees of the country would

be expressed with scarcely less appropriateness by any one of them than by the columbine, their companion, which owes so much to their protecting care. So, in the matter of agricultural supremacy, corn, cotton, and tobacco, as sample products raised on American soil, suggest the same abundance which is symbolized by the columbine's horns of plenty. The columbine, however, has this great merit, that it combines within itself the highest merits of all its rivals. Accordingly it comes as the peacemaker among the flowers. The advocates of other flowers are ceasing to contend with one another and are rallying to its cause, since in the triumph of this they see the realization of more than the highest promise of their former hope. Moreover, in its role of peacemaker, and as preëminently the emblem of peace, the columbine brings the national flower movement into most opportune relations with the present peace movement of the world. In the words of President McKinley, "The citizens of the United States have the right to be proud that their country is in the van in the efforts which are being made for international arbitration." Hence, it especially becomes us to adopt such a perfect emblem of peace as the columbine would be. Not only would this emblem announce to the world the idea of Christian policy which our nation has so long maintained, but it would also, by ever directing the thoughts of our people to the responsibilities of our high mission, aid us in maintaining the right. Thus the columbine idea, born of the Columbian Exposition, — our country's greatest celebration of the victories of peace, — becomes a part of that world-wide movement which the ages shall deem the greatest glory of this glorious nineteenth century.

We of the Columbine Association, who ask you to join us in spreading our message, offer to share with you an ever-brightening hope and a promise assured by past achievement. Our hope is that the columbine will soon win recognition as our national flower — possibly before the beginning of the new century so near at hand. Our promise is this: If you help the cause of the columbine you will be most effectively discouraging what is least worthy of the American people in the national flower movement. At the same time you will be suggesting uplifting thoughts to many of your fellow countrymen and will stir in their hearts some of the noblest and tenderest feelings. Therefore, so far as you can influence these wellsprings of national endeavor, you are helping

to shape the destinies of your country and to further the welfare of the world.

No one who has studied the growth of the popular desire for a national flower during the last ten years will permit himself to ask the question, Shall we have such an emblem? The American people may be trusted to accomplish their hearts' desire. The fundamental question for all of us to decide is this: Shall our national flower be a cause of regret or shame, or shall it be as fitting and noble an emblem as the world has ever seen? We are doing our best to bring the national flower movement to an issue of which our country may be proud. We need your help. Help us!

BUSINESS MEETING.

SATURDAY, March 5, 1898.

An adjourned meeting of the Society was holden at eleven o'clock, the President in the chair.

Charles H. B. Breck, Chairman of the Committee appointed at the meeting on the fifth of February to prepare a memorial of Edward C. R. Walker, reported the following preamble and resolutions, which were unanimously adopted:

Whereas, God in his infinite wisdom has removed from among us one who for many years took a great interest in and labored diligently for the welfare of the Massachusetts Horticultural Society, even so long ago as when the Exhibitions were held in the old Horticultural Hall on School street, and who for three years, from 1847 to 1849 inclusive, served the Society as Recording Secretary, and

Whereas, Edward Charles Rollins Walker further testified to the enduring love he bore the Society by a most liberal bequest,

Resolved, That the loss of one who was so much interested in the welfare of the Society in its infancy awakens our kindest remembrance.

Resolved, That we fully appreciate the esteem in which Mr. Walker held the Society, and that we cherish his memory, would emulate his example, and mourn his death.

Resolved, That these Resolutions be entered upon the records of the Society, and that a copy of them be sent to the family of the deceased.

CHAS. H. B. BRECK,
A. C. BOWDITCH,
WM. C. STRONG,
} *Committee.*

Charles E. Richardson presented his report as Treasurer for the year 1897, approved by the Finance Committee. It was voted that the report be accepted without reading.

President Appleton referred to the provision in Section VIII of the Constitution and By-Laws, that the President shall report from time to time what measures, in his judgment, are necessary for promoting its objects and extending its usefulness, and stated that

he was much concerned for the safety of the Library in case of fire. To guard against loss or injury from this cause, he proposed the following vote:

Voted, That the President is hereby authorized to lease rooms in a fireproof building for the use of the Library — in the Tremont Building if possible, or some other fireproof building conveniently situated in the business part of the city, at such cost as shall be approved by the Finance Committee, until such time as the Society shall have erected a fireproof building of its own; the moving to be done under the direction of the Library Committee.

Robert Manning moved an amendment that the subject be referred to the Library Committee, to be considered at a special meeting called for that purpose.

Ex-President William H. Spooner moved to lay the proposed vote and amendment on the table, and this vote was carried.

The President, in further discharge of the duty imposed on him by the above-mentioned section of the Constitution and By-Laws, introduced the following vote:

Voted, That the President be authorized to receive proposals for the bettering of the Society's accommodations by the erection of a new building on the present site, the Society to be put to no expense on account of said proposals; but the President may have such plans as may be offered hung in the Lower Hall for the inspection of the members.

This vote was passed in the affirmative.

The Secretary laid before the Society a letter from Peter Nøvik, Secretary of the Horticultural Society of Norway, acknowledging his election as a Corresponding Member of this Society, and thanking the Society therefor.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Frederick Law Olmsted, Jr., of Brookline,
James F. Harlow, of Quincy,
James Sturgis Pray, of Cambridge.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 12, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following is the substance of the lecture given:

THE RELATION OF OUR PUBLIC SCHOOLS TO RURAL AND URBAN LIFE, AND THE VALUE OF NATURE STUDIES IN OUR SYSTEM OF PUBLIC INSTRUCTION.

By GEORGE T. POWELL, Ghent, N.Y.

In the solution of any great question there are always discovered agencies or influences, which, if properly used, will be found to be closely associated with its successful settlement. There is no subject before the people today more harassing than that of the concentration of population in cities. It is affecting our social, business, and political interests. It is a problem surrounded by great difficulties. Yet, when our all-powerful educational forces are turned upon it there will be found greater promise from them than from any other present known source.

The tendency of the population to concentrate in cities during the last half-century has been marked, and the growth of cities during the last thirty years has been phenomenal. From 1790 to 1880 the population of this country increased twelve times, while that of cities of over eight thousand inhabitants increased eighty-six times. In the past one hundred years the population of New York has increased seventeen times, while that of New York city has increased forty-six times. Albany has increased its population in this same period twenty-seven times, and Rochester sixty times. From 1870 to 1890 the increase in population in New York State was 1,610,000, while the increase in value of real property was $1,659,000,000. In 1869 the value of our farm products was $253,000,000. Twenty years later it had fallen in value to $161,593,000, while the farming land of the State has depreciated fifty per cent.

These facts present some serious problems for the producers of fruits and farm crops. The growth of cities ought naturally to be of great benefit to those who grow food products, but unfortunately

in this rapid growth of our cities there is a large increase of the non-earning and dependent class, filled from the ranks of the unemployed.

It is stated by the Bureau of Labor that forty per cent of those engaged in the organized trades of our State are unemployed, and this is undoubtedly true in most of the large cities of our country. This large army of the unemployed in cities, supported by charity, are not consumers of fruits, and before we can again find ready sale for the products of our orchards and vineyards, at anything like remunerative prices, the problem must be solved of the employment and opportunity to earn a living by this large unemployed class in our cities.

There are today in New York city nearly one hundred thousand of the dependent class, supported by public institutions and by private charity, and in all of the large cities of our country will be found a proportionate number, all of which affect and lessen the consuming power of cities, and become a heavy tax and burden upon their industry and prosperity.

This is not without its effect upon the food producers of the country. The relation that exists between those living in the country and those living in the city is intimate; the prosperity of one depends upon the prosperity of the other.

There are several causes that have long been operating to draw people away from rural living. All have a common interest in the soil. We stand today the richest nation in the world on account of the wealth of our soil. We have been taking from it to support not only our own country, but other nations as well. In the older portions of the country we are feeling a want of this power in the soil itself. It is not as productive as it used to be. The three principal elements, nitrogen, potash, and phosphoric acid, are being removed. One ton of timothy hay removes from an acre of soil plant elements to the value of $5.45. It will be seen that each ton carries that value from the soil to the city. [These figures were shown on a chart which was made some time ago; the figures are a little high for today.] One ton of potatoes carries away plant elements to the value of $2.00, which is mostly in potash; wheat over $7.00. Butter removes the least of any, only about 46 cents to a ton. It is very often found, however, from impurities, that much more is taken away. This shows that butter dairying is inexhaustive. Fruits also carry very little away from the farm. Population

is now leaving the farm because the soil is depleted and farming is unprofitable.

Another cause is bringing agricultural products from interior sections of our country by railroads and canals. Other nations are doing the same thing; bushels of wheat, etc., are being brought out at cheaper cost, and we are obliged to meet this competition. The English capital is reaching into India, Australia, and South America with railroads. In Russia two thousand miles of railroad have just been completed, which will bring out thousands of bushels of wheat. In India wheat costs, to produce, only thirteen cents a bushel; in South America only twelve cents. In India, again, men work for ten cents and women for from three to four cents a day; in South America for from six to ten cents. There are other conditions there vastly different from those existing here. Eight cents will buy enough cotton to clothe a woman for a year. Manufacturing has been largely carried to cities, by railroads offering more favorable rates, and with the natural tendency for people toward community living the present facilities offered by electric and steam railways have brought about a great increase in urban population. Another cause for many leaving farms has been the introduction of improved machinery; that has required less labor to be employed on the farm.

During the winter of 1895 the influx to New York city was so great as to attract the attention of some of its most prominent citizens, who realized that, with the labor market already heavily overstocked, many of this great number coming to the city must drop into the large and rapidly growing dependent class.

Active steps were taken to inaugurate a careful inquiry into the causes that were working to send steadily increasing numbers from the country to the city. The investigation was made with the result that a surprising tendency was found among those living in the country to leave the soil and go to the city. Among other causes were found general discouragement in farming, depreciation in the value of land, low prices for products; churches supported with difficulty, ministers who once had strong congregations in their churches now are obliged to fill as many as three charges, schools declining in number and attendance, the young people leaving the farm. Many school-houses are closed, and the old district school is today seriously on the decline. There are over three thousand schools in New York with less than ten pupils each.

Some recommendations were made for educational work along some special lines, particularly in our public schools, as one of the most effective means of upbuilding the agricultural conditions of the State, and, in time, of holding and even drawing more people to the soil and to country living.

A committee of prominent citizens, known as "The Committee for the Promotion of Agriculture in New York State," was organized, with Hon. Abram S. Hewitt as Chairman, Robert Fulton Cutting, Treasurer, and Dr. William H. Tolman, Secretary; and under the auspices of this committee a series of agricultural schools was held for farmers in Westchester County. During the winter of 1896 a course of lectures on natural sciences, somewhat on the line of university extension, was given in the public schools of the same county. Instructors were sent out by Columbia and Cornell universities. The high schools of the towns or villages, and the district schools, were reached, and lectures given upon the soil, plant, insect, and animal life, with the application made to country living. Teachers and pupils were generally interested in this kind of instruction; members of boards of education and, in many instances, farmers came in to listen to the lectures given in the schools, and they expressed approbation of the plan, which was helpful to the children and instructive to all.

Many teachers will ask, how is it possible to introduce anything more than is already taught? It is not proposed to introduce extra work. Five or ten minutes two or three times a week as incidental instruction, when it seems almost impossible to make progress in the regular work, is the time to introduce a nature exercise. That school hours are often too long is shown by an experiment tried in Berlin. The school superintendent complained that at the end of the school hours the pupils were so exhausted that it was impossible to accomplish the best results. A test was laid out of ten minutes of work with five minutes' rest between. In the first two periods the work was satisfactorily done. In the third period a loss of memory was noticed and errors were found. In the fourth period the errors increased. In the fifth it was useless to try to do further work. The result was a shortening of school hours. If nature studies are brought in in the last period of the day it is a great help to the general work. Children come in better prepared for study the next day.

In New York, text-books are not thought of; the point is to go

to Nature herself. It is of vital importance that teachers know how to introduce methods. For an example of how the teaching is done, seeds may be used. Seeds which represent plant life in the vicinity of the school-house are brought in; also seeds of food products, garden plants, grains, and fruits. If beans are used as many as twelve different kinds can be shown which differ in size, color, and shape. These differences attract the children's attention at once. Seeds of timothy grass may be sent around among the children for them to examine; afterwards a magnifying glass is sent around with the seed. Clover seed is next observed in the same manner. A description of the plants, the root, stalk, leaves, and fruit is called for. An excellent language lesson may in this way be obtained. The teacher draws the plants on the board and points out the difference between them. This principle can be carried through all studies. Chemistry can be taught from the different elements which enter into the plant during its growth, and which are required to feed it. Physiology can also be studied through the agency of plants, and it can be shown that clover contains the elements required to give young animals strength, and should remain on the farm, while timothy is deficient in right food elements for young animals, but gives the necessary food for older animals, and should go to the city, where the older animals are found. Children can be taught why clover is so valuable to renovate the soil by showing them plants which have nodules on the roots, and giving lessons on how these nodules take the nitrogen from the air. If our farmers of half a century ago had understood this it would have been worth millions of dollars to the country. An interesting experiment was tried in 1896 in connection with the study of plants. We made this offer to all children of the schools of Westchester County, who would be interested in a practical and systematic way of studying a plant, that on application from them, in the spring, we would send them by mail, free of cost, half a dozen strawberry plants.

The children were to set the plants, a small circular being sent giving a few directions to aid in setting them properly. They were to learn all they could about the growth and habits of these plants, and they were required to write compositions on what they were learning and give the same to the school.

Large numbers of applications came in from boys and girls for

the plants. The pupils of the grammar schools of New York and Brooklyn observed in the papers the notice of the offer, and they sent in applications, some saying in their letters that they had no garden or soil, but they would get boxes of earth, put the plants in them, and place the boxes on the roofs of their houses. The offer of plants to the school children of Westchester County was copied by the agricultural and local papers of the State, and applications came from school children and teachers in almost every county in the State.

Nearly two thousand strawberry plants were sent to city children, and over ten thousand to those in the rural districts of the State, which was striking evidence of the interest children felt in taking up the study of a plant when proposed to them that it should be with the plant itself rather than from a book.

The strawberry was chosen because it is an interesting plant in itself; its blossoms are beautiful, and there is a marked difference in them, as some are fruitful and others, because of their construction, are not. The different parts of the flower were shown and explained upon printed charts in the lectures given in the schools. The economic value of the plant was also treated, and in addition to its beauty its possibilities were presented in furnishing support and income to those who skilfully managed it.

In many instances the study of insects was connected with that of plants, and the chief enemy of the strawberry, the white grub, was illustrated upon the same chart with the plant. The May beetle or June bug, which is the same, is the progenitor of the white grub that does so much damage to strawberry beds, and the life history of this insect was given in connection with the study of the plant. This never failed to give added interest to the pupils in the presentation of the subject.

The most practical way to teach is through an object lesson. Apples which are diseased or wormy, if shown to the pupils, will lead the way to a lesson on apple insects and diseases; the story of these insects or diseases can be told, and charts can be used to illustrate the story. Ten years of this sort of study will enable us to produce a race of intelligent and skilful farmers.

In the lectures given the thought of the possibilities of improvement of rural life through the schools was made prominent. The most familiar subjects connected with the farm and home and those surrounding the school were chosen.

The schools in the great orchard districts of the State should give some instructions to those living in and surrounded by this great industry that would help them to understand and know something of the fungous diseases and insect enemies that annually bring from fifty to seventy-five per cent of loss because of want of knowledge upon these subjects.

M. V. Slingerland, assistant entomologist of Cornell University, has estimated that the loss to the apple and pear growers of New York annually caused by the codling moth is fully $3,000,000, while Dr. J. A. Lintner, the State entomologist, estimates the loss to New York annually from all insects to be $26,000,000. Massachusetts furnishes in the gypsy moth an illustration of the damage that one insect may do and the cost of its control or extermination. Ireland is today pinched and suffering, and seriously threatened with famine from the failure of the potato crop, caused by a fungous disease that is readily controlled, but not understood by those who are growing that important food product.

Our public schools can do much to build up agriculture and bring a higher degree of prosperity to those who live in the rural portions of the State. Nature study is not to be introduced in our schools for the purpose of educating boys and girls to become farmers and fruit growers. It is to give a new inspiration and interest in the study of all subjects, and while the study of the soil upon which all depend for existence, and the study of animals, plants, and insects, will especially help those who do live upon farms, in the larger knowledge that will come from this study it will be of value to all, whatever the future occupation or living may be.

The value of this rational kind of instruction was so widely recognized that the demand for it throughout New York State became unexpectedly large.

Prof. L. H. Bailey, in 1896, was conducting a series of horticultural schools, under what is known as the Nixon Appropriation, made to Cornell University for the promotion of horticultural knowledge in the Fourth Judicial Department of the State. He arranged for a series of lectures, to be given in the public schools of this department, comprising twenty-two counties. The lectures on nature topics were to be given on the plan inaugurated in Westchester County, able instructors being furnished from Cornell

to assist in the work. In this broader field the instruction was enthusiastically received at every point.

The Committee for the Promotion of Agriculture, realizing the importance and value of extending this instruction to the whole State as one of the most effective ways to improve the condition of the rural population, turned its work over to Cornell University.

It was felt that with the strong equipment of scientific instructors in agriculture Cornell could best meet the needs of the State and fulfil the object of the committee in its investigation, to institute means that would eventually tend to equalize population, check the great flow to cities, and hold the people more prosperously and contentedly to the country. During 1897 Cornell has had several instructors in the field.

A large number of schools have received lecturers, leaflets have been issued as helps to teachers in the presentations of nature subjects, and teachers' institutes have had special instructors to give methods in nature teaching, the Department of Public Instruction coöperating in this progressive educational movement.

While the condition of the agricultural population of New York and New England has been one of discouragement and depression for the last quarter of a century, there may be said of New York that there is an uprising of educational interest at the present time such as has never before been known. There is an earnest desire to throw off old conditions; there is an active demand for knowledge, and a spirit of inquiry is everywhere marked. Greater knowledge and a broader education are newly felt as one of the greatest needs in farm life, and the effort to reach this through our public schools is meeting with hearty and universal support. A few years of the present line of instruction given in our schools will greatly aid in the permanent upbuilding of all interests of the State and of society, both rural and urban.

Discussion.

The President said he had just attended the fifty-sixth anniversary of the Worcester County Horticultural Society, and that a speaker there referred to the great value of such lectures as we have had today. The cultivation of the power of observation might be the salvation of the country.

Philip Emerson spoke of chrysanthemums which had been given

children at Natick by the gardeners of some of the large estates in Wellesley. The results which the children obtained were surprising, and much better than the gardeners thought possible. He said that the growing of beans and similar seeds had been encouraged in the upper grades, and thought that if some committee could send out practical directions for nature studies the schools would gladly take the matter up.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 12, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, Vice-President CHARLES H. B. BRECK in the chair.

The following lecture was delivered on the John Lewis Russell Foundation:

THE RESISTANCE OF PLANTS TO PARASITIC FUNGI.

By EDWARD A. BURT, Ph.D., Professor of Natural History in Middlebury College, Middlebury, Vt.

Fungi are defined as plants with vegetative body not differentiated into stem and leaves; and they do not contain the green grains called chlorophyll. Fungi are propagated by spores, or by portions of the vegetative body, some one or all of which may give rise to an independent plant or plants.

Place of Fungi in the World's Economy. — During the present decade so much is being published on the destructive work of parasitic fungi that the general reader must be on his guard, lest he conclude too hastily that all fungi exist in this world merely to cause disease or perhaps death of more highly organized plants which might produce food for the animal world or contribute to its æsthetic gratification. When the horticulturist has his carnations destroyed by the rust, his seedlings ruined by the damping off fungus, his peas produce a crop hardly worth the picking through the mildew, his potatoes a failure by the rot, his apples and pears of an inferior grade by the scab, and perhaps his family brought to the verge of death by diphtheria or typhoid fever, — when he realizes that all these troubles and many others which your own experience may suggest are due to fungi, it is no great wonder that he sees but small compensation in the crops of mushrooms which

he has grown, and is tempted to conclude that fungi could be spared from this world. But he might with equal reason conclude that the rains of summer are of no avail, because they gully his fields, sprout in the shock the harvested grain, and drench himself to the skin.

Fungi have an important and a peculiar work in the world's economy. The green plants which contain chlorophyll are constantly converting carbon dioxide, and the earth's available store of inorganic matter in the soil, such as water, soluble phosphates and nitrates, salts of potassium, calcium, iron, etc., into complex organic compounds of thallus, fructification, stem, leaf, and root. A portion, and only a comparatively small portion of the whole, of this organic matter, at various times in the course of its formation, is used as food by animals and is broken up into simpler compounds and returned to the soil. At the end of the season or at death of the plants the unused plant matter is left to accumulate on the surface of the earth. We can form some idea of the amount of this accumulation for a single season by the abundance of dead leaves on the ground in autumn in our streets and forests, and by the dead stems and leaves of grasses and weeds which may stand knee-deep or waist-deep in some field left undisturbed by man and his flocks. As trees and other woody plants die their trunks and branches become a part of the accumulation on the ground, as we see in primitive forests.

If kept permanently in the form of dead leaves or dead wood organic matter would be of no more value to the soil than any other covering. Its stores of carbon, nitrogen, potassium, phosphorus, etc., are not in forms available for use as plant food, by the green, chlorophyll-containing plants. Decay must take place first; that is, the complex molecules of insoluble organic compounds must be broken up into simpler, soluble forms. Could decay and the consequent return of food matters to the soil be prevented, in the natural order of things the soil would lose its stores of plant food and become covered by a deep accumulation of dead organic matter.

Fungi are the causes of decay. They thrive in moist places and light is not essential to their growth. The dead leaves and wood of the higher plants, and all dead organic matter which is not kept too dry for their growth, or at too high or at too low a temperature, or without special protection, is soon attacked by myriads of

fungi, ranging from microscopic Bacteria and Moulds through minute Ascomycetes to conspicuous Basidiomycetes, such as species of mushrooms and Polyporus. Fungi make prompt return to the soil of plant and animal remains which would otherwise be withheld from it. The soil does not contain such an abundance of plant food that the work of such fungi, called Saprophytes, can be dispensed with.

While most fungi are saprophytes and have to do only with dead organic matter, still very many others are to be found in more intimate contact with living organisms, and more especially with the higher plants. In some cases the higher plant suffers by the contact, and then we apply the term *parasite* to the fungus; in other cases the higher plant, or perhaps both organisms, gain by the association, which is then called *symbiotic*. We can consider the latter relation but briefly.

Symbiotic Fungi. — It has long been known that growing leguminous crops, such as clover and peas, increase the amount of nitrogenous matter in the soil and can be advantageously used for its improvement in a rotation of crops. The source of the nitrogen of these compounds is the free nitrogen of air circulating through the soil. It is only within a dozen years that it has been established that the fixation of the nitrogen into compounds is due to the presence in the soil of fungi of a low order. Small tubercles form on the leguminous roots at the points where the fungi are in contact with them, and at these points the fungi yield nitrogenous substance to the roots and appear to receive starch compounds in return. We are too near this discovery to see its real magnitude, but, in its economic aspects, it will probably rank as one of the great discoveries of the century.

Leguminous plants are, perhaps, not the only ones directly dependent on fungi for food to some extent. The investigations of the last few years indicate that many plants and even trees, as the Coniferæ, growing in a soil largely composed of humus, are deficient in root hairs, and are clothed instead with a fungous growth of mycorhiza. The whole subject is in the field of active study at present, but it seems to be established that the fungus supplies food matter, presumably from the humus, to the higher plant. But when we reflect on the fact that the saprophytic fungi are converting insoluble and highly complex organic compounds into the soluble plant food of the soil, why should we not expect to find

some of the higher plants which use this food in close association with the agents supplying it?

With the conception which has been briefly outlined of the place of fungi in the world's economy we now turn our attention to fungi in their injurious relations to higher plants — to cases where the fungus anticipates the death of the higher plant and lives a parasitic life.

Parasitic Fungi. — Parasitic fungi are those which, stimulated by the cell contents of another living plant, penetrate wholly or partly into its tissues, and draw their nutriment from that source. *Obligate parasites* can live only in the parasitic condition; *facultative parasites* can live wholly or partly as saprophytes, and, under favorable conditions, exist wholly or partly as parasites.

Parasitism depends on the possession of a combination of characters by the fungus, adapting it for invasion of, and for maintaining itself in, the host, and on the lack, or presence in too slight degree, in the latter of means for repelling the invasion or destroying the invader. In many cases the contesting plants are so equally pitted that external conditions, as wounds, periods of wet weather or of drought, cold nights, or the presence of a fungicide, give to the favored contestant the decisive advantage. The requirements for the fungus are:

1. Ability to maintain its life during the critical period of germination from the spore and for an interval afterward. During germination, and usually for some time afterward, the incipient organism is wholly dependent for food on the supply contained in the spore.

The spore, however, is only a single cell or a group of cells, each capable of independent germination. The spores are produced in vast numbers. In size they are like the finest dust, having a diameter in some cases of only 1μ ($\frac{1}{25000}$ in.), but usually averaging ten times that size. Each contains a nucleated mass of protoplasm, except in the bacteria, and carries but little food substance.

In order that the spore of an obligate parasite may infect a plant it must fall on a suitable species and then germinate and throw out a germ-tube which can penetrate the host and obtain food from that source in the short time for which the original supply of the spore is available. This is a very critical period in the life history of a parasitic fungus, and only a very small

proportion of the germinating spores can survive the ordeal if the environing conditions are at all unfavorable. Too dry an atmosphere immediately after germination deprives the would-be parasite of its moisture and kills it. An equally fatal result follows if the delicate germ-tube has to creep over a surface coated with poisonous copper salts or other fungicides; this is the philosophy of spraying against fungi as now practised in horticulture.

2. After germination the fungus must be able to make its way through the defensive structures on the outer surface of the host. This is the second requirement which the fungus must satisfy, but this will be taken up later on in connection with the host plant.

3. The fungus must be able at the least to hold its place in the tissues of the host and to draw its supplies of food from that source, in spite of the resistance encountered.

The plant attacked is a complex structure, the result of cumulative successful variations of a long line of ancestors before man began its cultivation. A stream of water containing plant foods in solution enters the plant at the roots, passes the length of the stem, and emerges from the leaves and other aerial surfaces in the form of a vapor, usable and non-volatile portions of the stream being retained. Primarily, the structure of the plant is adapted to the maintenance of this food-supplying stream; the root surface is adapted to its absorption; the leaf structure to its transpiration; and the stem structure and surface to its transfer from root to leaves with the minimum of evaporation. At the roots and at the leaves and young shoots the structural requirements for absorption and transpiration of the stream are opposed to the formation of a covering impenetrable by parasitic fungi; nevertheless we cannot but believe that the attacks of these fungi have been to some extent a factor in the evolution of structure of the higher plants.

The nature of the attack made by fungi against each surface of the host, and the resistance which is encountered, may be considered with advantage in connection with some common diseases which have been best studied.

The Root as the Region of Attack. — For a short distance back from their tips the smaller roots and rootlets have their superficial cells with thin uncuticularized walls through which water is readily absorbed. Lateral outgrowths of these are the root hairs. This

outer layer is soon cut off from the internal tissue of the root by the formation of a deeper seated cork layer, which gives to the older roots a bark, or protective covering, very similar to that of the corresponding stem, to be described further on. Infection of the root may therefore occur by plant structures able to bore through the mechanically resistant covering of cork, or by organisms able to penetrate the root hairs and get deep enough into the interior of the root so as not to be shut out by the formation of cork. We will consider first the latter mode of infection.

Plasmodiophora Brassicæ, the fungus causing club root of cabbage, turnips, and other Cruciferæ, is one of the most successful fungi attacking plants at the root. The disease attacks young seedlings and older plants; its symptoms are shown in from three to five weeks by the wilting of the leaves, which become lighter colored and rather yellowish. The characteristic swellings may then be found on the roots. Cabbages suffering from this disease fail to head.

If thin slices, cut from one of these swellings with a razor and placed in a drop of water on a glass slide and covered with a cover glass, are then examined with a compound microscope, the fungous cause of the disease may be seen. Many cells of the root are swollen to many times their usual size, and they contain the fungus in different stages of its development. Some show it in a plasmodial stage, with its young protoplasm only partially filling the cavity of the cell; in others the plasmodium is fruiting and becoming a mass of minute spores. If sown in water these spores germinate in a few hours, producing motile, ciliated swarm-spores. The ciliated swarm-spores infect sound plants, it is believed, by penetrating their root hairs and passing from thence into the deeper cells where starch is stored. Such penetration has not yet been observed, however, and it may be that they gain access to the interior of the root through punctures made by worms and insects, but the former mode seems the more probable.[1]

This disease is especially troublesome to truck growers, because they do not practise a long-period rotation of crops. Roots or portions of roots infected with the fungus are left in the ground or on its surface when the crop is harvested. The spores are liberated through decay of these roots, and they remain alive in the soil for several years. If another crop of cabbages or turnips is

[1] Eyclesbymer: "Club-root in the United States." "Journal of Mycology," 7: 83.

planted in this soil the following season it becomes infected at once, and so the disease is propagated from year to year.

Halsted announces that air-slaked stone lime is an effectual preventive of club root, and the best so far found. It should be used at the rate of from seventy-five to one hundred and fifty bushels per acre, and spread on the ground in the fall, and not turned under until spring to insure the best results. Applications should be made every other year to severely clubbed land on which turnips or cabbages are grown yearly.[1] This method of treatment seems well adapted to the needs of market gardeners.

Not much is known of the resistance which plants offer to infection of their roots by Plasmodiophora. The cabbage and the turnip seem quite helpless when pitted against it, judging by the certainty with which the fungus wins. That some resistance is offered may be inferred from the fact that all species of Cruciferæ are not equally susceptible to the disease. Halsted[2] has made observations on the comparative susceptibility to club root of sixteen species of Cruciferæ. He finds that charlock is the most susceptible on his list; white mustard, second; penny cress, third; shepherd's purse, seventh; black mustard, ninth; and so on. One is surprised to note that charlock, *Brassica Sinapistrum*, one of our commonest weeds, is the most susceptible species on the list. Club root is fatal to the cabbage and turnip. How is this weed able to survive? Its survival affords an object lesson for the horticulturist. Its seeds are produced in abundance and become widely distributed. Not all fall in an infected seed-bed; but those which do suffer the penalty. Many lodge in ground free from the fungus, and there they grow and perpetuate their kind. Dissemination of seeds should be regarded as one of the adaptations by which a species, in some cases, may successfully resist extinction by a more powerful fungus.

Infection of the root is more usually by mycelium, which creeps through the ground from root to root only a few inches below the surface. A "root rot" of some kind is the result, as of the grape by *Dematophora*, of the pine by *Armillaria mellea*, and, perhaps, of the beet and alfalfa by *Rhizoctonia*. One of these fungi, *Armillaria mellea*, the honey mushroom, is very common in our woodlands in

[1] N. Jersey Ag. Exp. Sta. Rep. for 1894, pp. 285 and 288 (1895); and Rep. for 1896, p. 306 (1897).

[2] N. Jersey Ag. Exp. Sta. Rep. for 1896, p. 309 (1897).

September, growing about stumps. The pilei arise from black, root-like strands, called rhizomorphs. Hartig[1] finds that when the fungus is well established in a root system rhizomorphs grow out and extend through the ground often for a distance of several feet. If they come in contact with the living root of a pine they are able to bore their way into it. Then the individual hyphæ of the rhizomorph spread through the resin ducts and medullary rays to all parts of the roots and stump, killing the tree and producing a form of decay called "white rot." *Armillaria* is very common as a saprophyte. Hartig states that it is a very destructive parasite on all conifers, and also on *Prunus domestica* (common plum) and *P. avium* (Mazzard cherry).

Epidermal Covered Surfaces of Leaves and Young Shoots as a Region of Attack. — The leaves and younger portions of the stem of woody plants, and the whole stem of herbaceous plants, are covered by colorless transparent cells arranged side by side, in most plants in a single layer, called the epidermis. The outer wall of the epidermis is cutinized, *i.e.*, naturally waterproof. This waterproof covering prevents rapid evaporation of moisture from the tissues of the living plant, and their consequent desiccation. As already stated, water vapor is constantly being exhaled from the epidermal-covered leaves and shoots, but it is by a regulated transpiration from deep-lying cells, and it emerges through openings in the epidermis, called stomata. The stomata open and close automatically, regulating the transpiration stream to suit the needs of the plant. In dry weather the stoma is nearly closed; in wet weather, with the atmosphere nearly saturated, the guard-cells of the stoma become turgid with water from the root, more spherical in form, and give a larger opening for the stoma.

While the epidermal covering prevents the plant from excessive drying it is also of great importance as a means of resistance to fungous invasion by withholding moisture from the fungus spores on its outer surface, and by interposing a barrier which must be pierced. As the epidermis is waterproof the spores which lodge on its outer surface can receive no moisture from the succulent tissues of the plant, but are entirely dependent for moisture for germination on that which condenses on the leaves as dew or falls as rain. In dry weather spores are very apt to fail to germinate, or if germination does occur in the short period during which the

[1] "Diseases of Trees." Eng. trans., p. 209, 1894.

leaves are wet with dew the delicate germ-tube, less able to retain its moisture than the spore, is likely to perish on the following day. If the leaf has a waxy surface or a form likely to cause the moisture to collect in drops and fall from the leaf, this is an additional advantage against infection.

On the other hand protracted rains, not so violent as to wash the spores from the leaves, or murky weather with frequent showers and the air nearly saturated with moisture, favor germination of the spores and enable their germ-tubes to attack the epidermis with full vigor or to grow over its surface to a stoma. In such weather the stomata are also widely open, as already stated.

Penetration of the Host. — The behavior of the fungus immediately after germination varies with the species. In the powdery mildews (Erysipheæ) forming white coatings on leaves and young shoots, as of the pea, rose, and lilac, the germinating spore gives rise to a cylindrical thread-like body, called a hypha, which branches and spreads over the surface of the epidermis. From points of the hyphæ, in contact with the epidermis, branches push down directly against the epidermal cells, cause minute openings in the wall, and through these gain entrance into the protoplasmic part of the cells. Here the end enlarges. Such branches are called haustoria. Through the haustoria the fungus draws its sustenance from the host, while the main body of hyphæ remains on the outside, forming the familiar white patches.

These powdery mildews are easily destroyed. Any substance poisonous to the fungus, but not injurious to the host, may be used for the purpose, as flowers of sulphur dusted over the leaves.

Most parasitic fungi gain entrance to the deeper lying tissues of the host as soon as possible after germination. In some cases the germ-tube creeps along on the surface of the leaf until the end reaches a stoma and then curves through this into the intercellular space beyond. The æcidiospores and uredospores of the rusts illustrate this mode of penetration. In other cases the germ-tube may grow directly through the epidermis into the underlying tissue, or, more rarely, it may grow down through the epidermis in the partition wall between its cells.

The young leaves and tips of branches are more susceptible to infection than the older parts. The common corn smut can infect only the young seedlings and other immature parts of the Indian corn. These young portions of the plant are tenderer than they

are when older, their cell walls are thinner and less strongly cutinized, and they probably offer less mechanical resistance to penetration by the fungus, and are more permeable to ferments secreted by it. From these differences in susceptibility of young and old epidermal-covered organs we may infer the nature of the resistance against fungous attack afforded by the fully developed epidermis, and how excellent a protection it is under normal weather conditions.

Bacterial Brown Rot of Cruciferous Plants. — We have now to consider a disease of great interest, because the infecting organism so successfully avoids the outer defences of the host. I refer to the bacterial brown rot of cabbages and other cruciferous plants, which was first described, and its cause determined, by Pammel.[1] and has recently been more fully studied by Smith.[2] The bacteria, *Pseudomonas campestris* (Pammel), Smith, causing the disease are believed to become scattered over the leaves with the dust or to be left there by insects crawling on healthy plants after they have been on, or perhaps biting into, diseased plants.

The cabbage has openings, called water pores, along the margins of its leaves. During cool nights in summer the roots absorb more water than can be transpired from the leaves, and it accumulates in their cellular and vascular tissue under sufficient pressure, so that it finally oozes from the vascular tissue through the water pores and stands in drops along the edges of the leaves.[3] As the water accumulates along the margins the bacteria which happen to be lodged there simply swim through the pore into the leaf and spread the disease along the vascular bundles. Infection also occurs by the bites of insects which have been feeding on diseased plants. The spread of the disease is shown by the brown veining it causes, which contrasts against the dark green of the leaf. Both these ways of infection are exhibited in a specimen which you may examine, and for which I am indebted to Dr. Smith. From fifty to one hundred and fifty separate infections were often seen on cabbage plants in widely separated localities.[4]

Bark-covered Surface of the Stem as a Region of Attack. — The epidermis of woody stems usually becomes disorganized in a

[1] Iowa Agric. Coll. Exp. Sta. Bulletin, **27**: 130, pl. 1, 1895.

[2] "Centralblatt f. Bakt., Par. und Infekt.," 2 Abt., Bd. 3, pp. 284, 408, 478, pl. 6., 1897. "The Black Rot of the Cabbage." "Farmers' Bulletin," No. 68. U.S. Dept. of Agric., 1898.

[3] Vines: "Text-Book of Botany," p. 699, 1895.

[4] "The Black Rot of the Cabbage," p. 6.

few years, and is replaced by bark, largely composed of cork. Although certain openings (lenticels) through the bark for aeration make places for lodgment of many Ascomycetous fungi; nevertheless the bark, as long as intact, affords an effectual barrier against parasitic fungi very destructive to wood. Breaks through the bark occur frequently, however, as by the boring of insects, the gnawing of animals, the breaking of branches, bruises of implements of man, and improper pruning.

An attempt at repair of these wounds is made by the natural processes characteristic of the plant, as by the formation of cork or of callus and new cambium. If the wounded surface is large, many years will be required for it to heal, and during all this time it is liable to infection. Coniferous trees, as the pine and the spruce, which are especially subject to attack, pour forth a pitch from wounded surfaces of the sap wood. This gradually hardens, and forms a protective covering, although the heart wood, which is destitute of pitch, may remain exposed to infection, if the wound is large. The deciduous-leaved trees which we cultivate lack such a natural ointment for their wounds. We can make good the deficiency by applications of grafting wax, coal tar, or paint, to their wounded surfaces, and greatly diminish the risk of infection. When large branches have to be removed from a tree they should be cut from it so close to the trunk or to some vigorous branch that liberal food supplies will be available for rapid growth about the edges of the wound. Dead wood projecting from a living tree and raw wounds furnish places for infection by the spores of parasitic Basidiomycetes. We often see the bracket-shaped fructifications of these fungi standing out from dead places in living trunks of trees, and becoming larger year by year as their hyphæ spread through and destroy the living wood of the trunk.

The Fungus in the Interior of the Host. Growth of the Fungus and Effects produced. — A germ-tube or hypha, reaching the interior of the host, branches and forms a mass of hyphæ called collectively a mycelium. Many fungi have a mycelium which extends for only a very short distance beyond the point of infection and causes merely local disease. This is the case with many "spot diseases" of leaves, which often, aside from their disfigurement of the foliage, apparently cause no more injurious effect on the plant as a whole than would result from the destruction of the same areas by insect work.

In other diseases the mycelium may spread more extensively from the point of infection, causing serious disturbance, or death of whole organs or the entire plant. *Armillaria mellea* destroys the root system of conifers, and causes death of the tree. *Pythium De-Baryanum*, the best known damping-off fungus, spreads over the ground of the seed bed, and kills seedlings by infecting and destroying their lower parts usually.[1] *Phytophthora infestans*, the late blight, or potato-rot fungus, spreads with great rapidity through the plant. Its infection is likely to occur in the leaves.

The hyphæ forming mycelia grow either between the cells of the host, usually giving off haustoria laterally, which pierce the adjacent cells and absorb food, or, in other species, of which the potato rot (Phytophthora) is an example, they may push directly through cells in the way. Destructive effects may immediately follow infection (Phytophthora), or the fungus may live for a long time in the tissues of the host, extending its mycelial system, and drawing food supplies by haustoria, and then abruptly form its fructifications, at the same time killing the infected tissue.

Different parasites absorb different substances from their hosts. Attention has been called already to the fact that the powdery mildews penetrate the epidermal cells, with their haustoria, and absorb through their delicate walls portions of the nutrient matters of the protoplasm. The reserves of starch which accumulate in the cells of the host are an especial object of attack with the potato-rot fungus, Phytophthora, and with many wood-destroying fungi.

The cell wall is also a chief object of attack by wood-destroying fungi. They "rot" the wood. Lumber dealers have several terms descriptive of the kind of rot characteristic of the species, as red rot, white rot, dry rot, etc. *Trametes Pini* produces "ring shake" in pine wood. The hyphæ of this fungus act first on the lignified portions of the partition wall, dissolving and absorbing first the middle layer (primary membrane) of the wall, and thus loosening the cells from each other. At the same time they are dissolving the incrusting lignin of the secondary membranes of the wall, and there is finally left only a thin cellulose membrane bearing the ash constituents.[2] Other fungi, as *Polyporus borealis*, which I find

[1] See Galloway: "Notes on the Fungus causing Damping-off." Trans. Mass. Hort. Soc., Part I., 1891, p. 230.

Atkinson: "Damping-off." Cornell Univ. Agr. Exp. Sta. Bulletin, No. 94, 1895.

[2] R. Hartig: "Diseases of Trees." Eng. trans., p. 52.

occasionally on spruce trees in the Green Mountains, are stated by Hartig to exert a more selective action on cellulose.

I have called your attention to these details of the work of a few parasites partly that you may understand why it is that a given species is restricted to so few hosts. Each would-be parasite may be regarded as representing a definite number of capabilities. There are but few higher plants exactly suited to its needs. With resistance to be constantly overcome an unfavorable environment is a fatal handicap.

The effects of the fungous hyphæ on the cell walls of the host indicate solutional work as the explanation of the phenomenon of penetration and destruction of the cell wall. The hyphæ secrete substances, called ferments, capable of dissolving lignin and cellulose of the walls. When the tip of a hypha or haustorium is applied to a wall the portion in the way is dissolved before it, if the living cell cannot counteract or dispose of the ferment. There must be differences in the ferments secreted by different fungi, as has been pointed out by Hartig in a case of starch preservation.[1] A piece of oak wood was infested with *Polyporus dryadeus* and *P. igniarius* simultaneously. In the region of the wood where the unlike kinds of mycelia met, the starch was well preserved in the cells, while in other parts of the wood occupied by either fungus alone it was wholly destroyed.

In many cases cells of the host are killed by mere contact of a hypha without penetration. Some fluid poison from the fungus must have soaked through the wall of the cell, through the resisting protoplasmic lining of the cell, and exerted its deadly effect on the protoplasm. Oxalic acid in the form of free acid is produced by many fungi. This acid is very poisonous to living protoplasm. It has been suggested that fungi may kill the cells of the host by flooding them with oxalic acid, perhaps aided by a ferment.[2]

Internal Resistance to the Fungus. — Successful resistance to fungous invasion by cells in the interior of the plant seems to depend on vital processes of these cells when in normal health and full activity. We know how subject to rot fully ripe fruits are, as for example the apples now stored in cellars. Yet they cannot

[1] R. Hartig: "Zersetzungserscheinungen," 1878.

[2] Ward: "Croonian Lecture on Relations between Host and Parasite," Proc. of Roy. Soc. 47: 428, 1890.

rot except as the result of fungous attack, and observations on their infection by the fungi concerned in their decay (*Penicillium glaucum*, *Trichothecium roseum*, etc.) have led to the conclusion that fungi develop more easily the nearer the vital powers of the parts attacked are to their lower limit.[1] The same thing has been found to be true for the vegetative organs of several species of succulent plants which have been studied, and Tubeuf adds that fungi can frequently penetrate withering plant organs, while they could not infect the fresh living tissue.[2]

De Bary made an interesting experiment showing that the entrance of a hypha into a cell is dependent on the condition of the protoplasm: A mature firm shoot of a Petunia was infected with the mycelium (of *Botrytis cinerea*) and the hyphæ penetrated into the cortex about 1 cm., and then grew no further; evidently because the cell walls were thick, and their protoplasm disposed of the poisonous zymase (ferment) as fast as it reached them. When the infection was made on slightly etiolated, rapidly growing shoots, however, the fungus entered at once, and destroyed the entire shoot offhand.[3]

Ward[4] has called attention to the fact that wet murky weather, with frequent showers and a nearly saturated atmosphere, especially if the nights are cool, interferes with the normal physiological processes of plants and lessens their capability to resist fungous attack. The transpiration stream is checked by the already saturated condition of the atmosphere, yet absorption by the root continues. The cell walls become suffused with water and organic acids. In such weather the plants are, physiologically, in the condition of somewhat etiolated shoots with lowered vitality, and their cells offer less than their usual resistance to the fungus. They already contain an abnormal amount of acid — more than they can dispose of — and are unable to use up the additional amount with which the fungus floods them. Therefore the fungus prevails.

It is a matter of experience that the weather conditions just described usually result in an epidemic of fungous disease. Enough fungi and spores to start an epidemic are usually about in summer. I have already pointed out how such weather favors

[1] De Bary: "Morph. and Biol. of the Fungi." Eng. trans., p. 380.
[2] Tubeuf and Smith: "Diseases of Plants," p. 58, 1897.
[3] Quoted from Ward's "Croonian Lecture," p. 430.
[4] "Croonian Lecture," p. 430.

the fungus spores in their germination and in their penetration of the epidermis. If such weather also lowers the vitality of the host plant below the point of successful internal resistance, we can see why the disease is able to spread rapidly over entire fields and whole States as an epidemic.

A fungus may be well lodged in the tissues of a host and yet receive such effective resistance as to be able to make headway only when the vital processes of the host are dormant. This is well shown in the contest between the European Larch and *Peziza Willkommii*, a wound parasite which spreads in the bast and wood of the larch about the point of infection, killing the affected portions and producing a canker. During the season of active growth of the larch, the fungus makes no headway and is, in fact, shut off from the living tissue of the host by the formation of a layer of cork. During the autumn and winter, with the cessation of growth of the larch, the fungus breaks through the cork barrier and advances further into the living tissues of the host. As soon as the canker spot makes its way completely around the trunk, death of all parts higher up results. Hartig has studied cases which afford evidence of such a contest having been waged for a hundred years.[1]

Many other examples might be given, but those cited show that the protoplasm of living cells in the deeper tissues of the plant has an important part in the resistance to fungus infection, and that their maximum resistance is offered when they are in good health and full activity.

Resistant Varieties. — Observation tends more and more to show that some varieties of a species, and some species, are more resistant to fungi than other varieties and species perhaps closely related. In the past the originators and introducers of new varieties of cultivated plants have fixed their attention too exclusively on productiveness, marketable character, flavor, color, beauty, etc. Horticulturists will eventually recognize that ability to resist parasitic fungi is also a very desirable character in a variety, and varieties having the qualities which we now prize so highly will then be developed from more resistant species and races. From this point of view, the Japanese Plums, with their greater freedom from black knot than our varieties of *Prunus domestica*, are well worthy of the consideration they are

[1] "Diseases of Trees." Eng. trans., p. 120.

receiving. By patient hybridizing experiments Europeans have obtained vines with roots capable of resisting phylloxera, with foliage proof against the downy mildew, and with fruit giving the esteemed flavors to old and well-known European wines.

Eriksson's researches on grain rusts have shown that there are some varieties of wheat able to resist the more frequent forms of rust, and in no way endangered by them. By the same method varieties adapted for the rust-infested districts of Australia have also been obtained.[1] Such results show what may be accomplished.

Transmission of Fungous Disease to Offspring. — We have hitherto been taught by writers on plant diseases that diseases of plants are not transmitted to the offspring. Hartig states that[2] "A transmission, by inheritance, of diseases to descendants is unknown in the vegetable kingdom. One may without hesitation make use of the seeds of plants suffering from any conceivable disease for the propagation of new plants." Eriksson's recently published researches into grain rust[3] are opposed to this conclusion. He found that outbreaks of rust occur in grain fields in a way quite inexplicable by our former knowledge of rust, and he was led to suspect that the seed might have been infected by the parent. For the last four years he has therefore been growing plants in sterilized earth in glass houses specially constructed to keep out the spores of the disease which may be floating in the air. He reaches the general conclusions:

A. The outbreak of grain rust is due (a) in the first place to germs of disease in the host plant itself, which in certain cases are inherited from the parent plant through the seed, and in which they lead a latent symbiotic life as a mycoplasma and continue to do so afterwards for a long time in the resulting plant, and (b) in the second place to external infection from the vicinity.

B. The intensity of grain rust is due (a) in the first place to the degree with which the dominant outer circumstances (weather, soil, manuring, and so forth) are able to convert the inner germs of disease from the latent stage of a mycoplasma into a visible stage of mycelium, and (b) in the second place to the accession of infective material from without.

These conclusions have been so recently announced that I am

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[1] Tubeuf and Smith: "Diseases of Plants," p. 82.

[2] "Diseases of Trees." Eng. trans., p. 16.

[3] "Swedish Researches into Grain Rust," "Bot. Gaz." 25 : 37, 1898.

unable yet to realize their full magnitude. That one kind of protoplasm may live in such close association with another kind as to be indistinguishable from the second kind, and then later on assume an independent existence, has not been suggested heretofore. If no mistake has been made these conclusions must lead to still greater advances in the knowledge of plants, and especially of the relations of parasitic fungi to higher plants. Eriksson points out "that they provide a new explanation for the varying susceptibility of different varieties of cereals, and also that we are warranted in suggesting that the predisposition of Hosford wheat to yellow rust may be explained by assuming that between this variety of wheat and the yellow rust an extremely vital mycoplasma-symbiosis is to be found, while, on the contrary, the Squarehead wheat is nearly exempt from the rust for the reason that no such symbiosis has arisen between this wheat and the fungus." They certainly indicate that seeds from plants affected with rust should not be used for propagation.

Discussion.

Benjamin P. Ware said that he and other farmers are interested particularly in club-footed cabbage. The lecturer had told us that spores may remain several years in the ground, and that they are particularly liable to attack one variety. He knew of a farm where there was a luxuriant growth of mustard sixty years ago. It would seem impossible to raise cabbages there if fungus was present, but it was not. Cabbage club foot must be new. It is a modern introduction. It is said that every variety of vegetable is subject to thirty different diseases.

Professor Burt replied that club root is an old disease, having been known more than one hundred years. Old Scottish records describe the disease. The original home of the disease is not known; it is distributed all over the world. The field of charlock may not have had the disease introduced there. A valley near Mount Mansfield, Vt., was so infected that the cabbage could not be grown there. On looking into its introduction there it was found that some one near Boston had sent infected plants there. The gardens are now full of it. The presence of the disease in cruciferous weeds carries the disease over from year to year.

Thomas Harrison asked whether the continuous cultivation of the soil with a cabbage crop is productive of the fungous disease.

Professor Burt said that it tends to perpetuate the fungus. The accumulation of the spores causes serious trouble in following years. There is no time to give the spores a chance to die out.

Mr. Harrison noted that the rotation of crops was recommended, and asked if the crops destroy the fungi.

Professor Burt replied that a fungus is liable to find only a few kinds of plants on which it lives. If a long rotation is practised and no cruciferous crop grown for several years the ground becomes free from the spores of the club-root fungus. The spores germinate and are destroyed. The crops of rotation must be such as will starve the fungus. With the cabbage a rotation of beet and turnip would continue the disease.

Mr. Harrison asked why there is no club root in certain parts of New Jersey.

Professor Burt said that limestone soils are found to give exemption from the disease. The same is found on Long Island, where oyster shells are used.

Samuel Hartwell said that manure will produce the disease, and that he should think that air-slaked lime would help, and asked whether we could thus plant cabbages with success.

Professor Burt said that lime kills the fungi in the ground, and is a fungicide for spores.

Mr. Harrison said that the wallflower is subject to club root.

Professor Burt replied that it is closely related to the cabbage.

On motion of William C. Strong, a vote of thanks to the speaker was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, March 26, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, Francis H. Appleton, in the chair.

The following lecture, which was illustrated with many lantern slides, was given:

Some Native Ferns of New England.

By Henry L. Clapp, Roxbury.

Many a person has a pleasant circle of friends living in different places and under different conditions: some in cities, others in

the country; some in highlands on aristocratic streets, others in lowlands on plebeian roads; but as he takes up his collection of photographs of these friends, and looks at each one in turn, what pictures with all their natural colors and movements flash upon the screen of memory! Dress, manner, distinguishing characteristics, and the individuality, atmosphere, and environment of each home come thronging upon his mental vitascope. It may be winter, and summer vacation scenes come almost unbidden; or it may be summer, and visions of autumn rambles and winter studies come back to him. These beautiful, instructive, it may be laborious experiences are the best part of life; they bridge over the rough and sad places; they kindle the imagination in anticipation of happier and more useful seasons in the future.

The fern gatherer also has his circle of friends in Nature's devious ways, and like his human friends these silent acquaintances have their family and given names, their selected places of abode, their distinctive dress and habits, their inherited traits, and their destiny to fulfil. It may be that they are to be buried, as in ages past, to be exhumed in the form of coal to minister to the comfort of man's body as they now minister to the happiness of his mind. As a part of his herbarium they may serve every winter to call up a delightful panorama of mountains and meadows, fields and woods, with all the color and movement of human life associated with it. It may be that as we look at their photographic representations today we shall be carried back in memory to delightful rambles and absorbing studies. But beyond that is the hope that some listener, some looker-on, may be moved to seek acquaintance with those graceful plant forms which we call ferns, and thereby experience a measure of that quiet happiness which such men as Gray, Eaton, Davenport, and Underwood have known.

Scope of this Hour's Work. — This illustrated talk is intended especially to help those who have made some progress in the study of our common native ferns. Necessarily the ground covered will be entirely familiar to those who have studied ferns to a considerable extent. Such must not expect to hear anything new. However, the hundred and thirty slides to be shown will be new, and, it is hoped, interesting and instructive. Without attempting to cover the whole field of our common ferns, or giving a complete botanical description of a single species, we can consider

some of their most prominent characteristics and the most interesting phases in their life history. Only such marked characteristics will be mentioned as would be noticed by one well acquainted with ferns in their homes. Minor details can be found in any good book on systematic botany.

A Few Technical Terms. — We cannot talk about ferns with profit unless we use the appropriate language, including those precise and expressive words which are called technical. But words alone, without antecedent experience on the part of the hearer, convey no meaning, call up no pictures, and make no impression. Names are best explained by the real objects to which the names belong; wanting the real things, their photographic representations, especially those on a large scale, will serve to make clear the meaning of terms.

That part of a fern which is above ground, including the green leaf-like blade and its stem, is called a *frond;* the stem in fern language is called the *stipe;* and its continuation through the flat green blade is the *rachis.* The separate leaf-like parts extending right and left from the rachis are *pinnæ*, the plural of the Latin word *pinna*, meaning a *feather.*

Many pinnæ and some fronds resemble a loose sort of feather. If the pinnæ are divided into separate divisions, as in the case of the Spiny Shield-fern, *Aspidium spinulosum*, such divisions are called *pinnules* (little feathers). If the frond has no pinnæ, but is shaped like a plantain leaf, for example, it is *entire;* if it has pinnæ that are not cut into separate divisions the frond is *once pinnate;* if the pinnæ are cut into separate divisions it is *bi-pinnate;* if the pinnules are similarly cut it is *thrice pinnate.*

Sori, or Fruit Dots. — On the under side of many common fern fronds there are fruit dots or *sori*, as they are technically called. They consist of bunches of spore cases, or *sporangia.* Sometimes they have coverings called *indusia*, which are of many different shapes. A single *sporangium* contains innumerable minute dust-like bodies called *spores*, which under favorable conditions develop into minute vegetable forms called *prothalli.* A cross-section of a sorus illustrated on a large scale will indicate the relative positions of the spores, sporangia, and indusium, which make up a *sorus.*

The Great Aspidium Family. — Members of the Aspidium family have been taken to illustrate the characteristic and minute parts of ferns, because they are so common that in almost any open un-

cultivated place one may find specimens enough for the identification of the family. In this family the indusium is shaped like a circular shield, for which the Greek word is *aspidion*. This word gives the family name, *Aspidium*. The given or specific names like *spinulosum* (full of spines), *cristatum* (crested), *marginale* (marginal), and many others, are still more significant, as John Smith is more significant than Smith alone. This Aspidium family, then, is distinguished by circular badges, family buttons, or coats of arms, as they might be called.

The Sword Fern. — A little difference in the shape of the indusium is the reason for the name of another family, that of the Sword Fern, the commonest fern of the household. The botanical name, *Nephrolepis exaltata*, is very significant. *Nephros* means *kidney*, and *lepis*, *scale*. The indusium is a kidney-shaped scale. The frond is upright and exalted; hence the name *exaltata*. The drooping habit, which the florists in and around Boston have had so much to do in forming, has led Mr. Davenport to give to the fern of that form the additional name, var. *Bostoniensis*.

Life History of Ferns. — With these brief references to the essential parts of ferns and the significance of their names we are in a measure ready to consider their life history, which in its early part is especially interesting, because it is so different from that of flowering plants, such as the corn, the bean, and the rose.

For instance, in the reproduction of a bean plant from a bean the process is direct; that is, what we call a bean is a complete embryo plant wrapped up with its earliest food in a covering, and under the combined influences of heat, light, and moisture it simply unfolds; there is one development, one step. On the contrary, a fern spore, which is often improperly called a seed, does not produce a young fern directly, but first gives rise to an intermediate form called a *prothallus*, a minute, heart-shaped, leaf-like body that has male organs called *antheridia* on the lower part underneath, and female organs called *archegonia* on the upper part near the sinus. The young fern is a product of this prothallus, and an indirect product of the spore. There are two steps in the process — two developments: first, the prothallus from the spore, and then the true fern from the prothallus. Certainly ferns are appropriately called cryptogamous plants, on account of this obscure mode of reproduction.

There are ferns whose sori, so far as form goes, might easily be

taken for flowers. Take, for example, the sori of *Schizocæna Brunonis*, a fern native to the East Indies. The indusium is divided into six petaloid forms, which come from under the sporangia instead of covering them from above, as indusia commonly do. The sporangia resemble the achenia, or seed-vessels, of some members of the Crowfoot family. Indeed, so far as the form is concerned, these sori might be taken for small buttercups, the divisions of the indusia representing sepals and the sporangia, achenia.

Distribution of Spores. — Let us consider the curious means by which spores find themselves in favorable conditions for the production of prothalli — how they escape from the spore cases and reach the earth where their work is to be started.

The sporangia, or spore cases, of the Christmas Fern, *Aspidium acrostichoides*, under favorable conditions will illustrate how spores are thrown from the cases. One important part of the sporangium consists in the annulus, or ring, on the outside. In drying, this ring contracts, ruptures the fragile walls of the sporangium straight across, and bends backward, sometimes so far that one end of the ring meets the other end, carrying the spores on the ruptured walls backward at the same time. Then it suddenly springs violently forward, throwing the spores away, and returns to its former position. If the ring is wet and dried a number of times the action is repeated as often, so that between sunshine and showers the spores are pretty effectually scattered, and the ring is worn out with hard work.

I took an Aspidium frond from the press in a warm summer evening and placed it on the table near a study lamp to examine the sori. I had scarcely adjusted the magnifying glass when I saw a violent commotion among the sporangia. They curled, twisted, snapped, and seemed to be batting each other vigorously. The moisture in them had not been entirely dried out while they lay in the press; but the heat of the lamp combined with the warm atmosphere of the room quickly dissipated moisture enough to produce the actions mentioned. A teacher who was inclined to doubt my statement of what I saw, afterward observed similar motions while holding fruit dots in her hand. Professor Atkinson, of Cornell University, by moistening sporangia with water and drying them over an alcohol flame, caused violent action to take place in sporangia from eighteen to twenty years old.

The spores of the Flowering Fern, *Osmunda regalis*, are dispersed by the springing of the two parts of the sporangium, the spores being thrown in two directions. Among flowering plants a great many similar springing contrivances have been observed. Examples of such are seen in jewel-weed, witch-hazel, violet, cranes-bill, storks-bill, wood sorrel, and other plants.

Crosiers. — One who can name plants only when they are in blossom is not much of a botanist; but if he has studied plants in their homes and can name them as soon as they appear above ground in spring, and can distinguish them by their leaves merely, he can claim to know them well. So one who has studied ferns in their homes from the start can distinguish genera and species by the crosiers as soon as they rise from the ground in spring. The *crosier* is a young fern frond rolled up as a strip of carpet is. It takes its name from its resemblance, when partly unrolled, to a bishop's staff, which is sometimes called a crosier. Its head is curved in the form of a shepherd's crook. The fern crosier in spring simply unrolls and grows in every part at the same time, developing somewhat like a bud and somewhat like a bean plant from a bean.

Many buds, as those of the horse-chestnut and the poplar, for example, have the tender parts protected by a substance resembling fur. In a similar manner the young and tender crosiers of some ferns are protected, some by wool and some by chaffy scales, usually of a brown color. Crosiers, like buds, are made up in the fall, and in early spring may be found grouped in a circular form called a *crown*. The crown of *Aspidium marginale* is usually very conspicuous, and is covered with dark brown scales. The Christmas Fern has a white satiny fur; the Cinnamon Fern, *Osmunda cinnamomea*, a brownish wool; Clayton's Fern, *Osmunda Claytoniana*, a white wool. The Royal Fern, *Osmunda regalis*, also has crosiers protected by white wool, but its slender lake-red stems or stipes serve to distinguish it from any other common fern in this region at an early stage of growth.

The crosiers of many ferns do not have the means of protection referred to, as in the case of the Lady Fern, for example. The coiled-up form seems to serve the purpose of protection sufficiently well.

To the unobservant or uninterested person crosiers look very

much alike, but the more one studies them in their homes the more obvious their differences become.

Dissimilarity of Fronds.—To carry on the life history of ferns farther, another step must be taken, and that is the development of crosiers into fronds. Fronds especially show very marked differences, although they too have been declared to "look all alike." We will now compare a few fronds unlike in shape.

Clayton's Fern, *Osmunda Claytoniana*, bears but little resemblance to the Royal Fern, *Osmunda regalis*. Its fruit is on pinnæ, from two to five pairs, midway of the frond; and, since these fertile pinnæ make a break in the sterile pinnæ, the fern is sometimes called the Interrupted Fern. The foliate parts of the Royal Fern resemble the leaves of a shrub more than those of any other fern in this region. The fruit is on long stems branching out at the top of the frond.

The Christmas Fern, *Aspidium acrostichoides*, is sword-shaped in outline. It has pinnæ, but no pinnules, and the sori are on the upper pinnæ, which are narrower than the sterile pinnæ. The Oak Fern, *Phegopteris Dryopteris*, is ternate, or in three well-defined parts, each part being more or less triangular in form. The Beech Fern, *Phegopteris polypodioides*, has the form of an arrowhead, and the two lower pinnæ are deflexed or bent downward and forward. The Maiden-hair Fern, *Adiantum pedatum*, bends around somewhat in the form of a horse-shoe. Surely these fronds do not resemble one another. There are some that do, which will be mentioned later, when one more stage in their life history has been noticed.

Basis of Classification. — Notwithstanding the great diversity of forms in fern fronds, the basis of classification is generally found in the composition, position, shape, and size of the sori. The mode of veining and the rootstalk are also important. The principal forms of sori are circular, stitch-shaped, straight and curved, cup-shaped, globular, and marginal — the last when the edge of some part of the frond is turned over so as to make a sort of hem for the protection of the spore cases. A comparison of the sori on the pinnæ of several species of our native ferns will illustrate the importance of sori as a basis of classification. Take, for illustration, a pinna each of *Aspidium marginale*, *Asplenium thelypteroides*, and *Dicksonia pilosiuscula*. The first has elevated sori, with shield-shaped indusia on the margin of the lobes of the pinna;

the second has straight stitch-shaped sori at an angle with the midrib of the lobe ; and the third has cup-shaped sori in the sinuses of the pinnules. Each of these species is put in a different genus from the others by reason of the differences in their sori.

Members of the Aspidium Family. — Keeping in mind that the Aspidium family is distinguished by indusia resembling circular badges or shields, we will notice the main characteristics of the species common in this region.

First in frequency comes the Mountain Fern, *Aspidium Noveboracense*. The fronds taper both ways from the upper middle part, the lower pinnæ gradually growing farther apart and smaller. This is so marked a characteristic that to distinguish the fern no other is really necessary. No other common fern has this characteristic. The sori are minute, and unless they are in just the right stage of development the glandular indusia are hard to make out. This fern grows on rocky, wooded hillsides and mountains. In color it is light yellowish-green — so light as to take almost white with the ordinary photographic plate, with which both yellow and green commonly take black. When the sunbeams come through the openings in the foliage of the trees and strike on these light-reflecting fronds the effect is unusually brilliant. They are delicate in structure and tender in constitution, passing away at the first approach of cold weather.

The Meadow Fern, *Aspidium Thelypteris*, is very common in moist woods and low land bordering on woods. The pinnæ commonly make a right angle with the rachis, and the lowest are but little smaller than the largest on the frond, and, therefore, it need not be mistaken for the Mountain Fern just described. The fertile frond looks quite different from the sterile frond. The margins of the lobes are strongly revolute, or rolled over so much as to make the lobes look narrow and acute. This contraction of lobes or pinnæ in fertile fronds is found in other species to be noticed later. If the frond is taken at the right season the circular indusia and the beginning of the curvature in the margins of the lobes may be seen plainly.

A very interesting fern, called by Mr. Davenport *Aspidium simulatum*, shows resemblances to both the Mountain Fern and the Meadow Fern. It has the shape of the Meadow Fern, but its sori are larger and its indusia are glandular, while the indusia of the Meadow Fern are not glandular. It is like the Mountain

Fern in respect to the glandular indusia and pubescent midribs, but is distinguished from it by its larger sori and Thelypteris-like fronds. Mr. Davenport says that it is somewhat later than its congeners, and prefers cool, swampy woodlands, and that he has called it *simulatum*, "on account of its remarkable simulation of a narrow woodland form of *Asplenium Filix-fœmina*, which almost invariably has conduplicate pinnæ when growing in the sun."

The Spiny Shield Fern, *Aspidium spinulosum*, takes its specific name from the sharp points or spines ending the numerous lobes of the pinnules. *Spinulosum* (full of spines) is, therefore, a very significant name. The pinnæ are commonly set on the rachis at an angle varying from forty-five degrees to sixty degrees, the lower ones being broadly triangular in shape. The basal pinnules on the lowest pair of pinnæ are the longest, and they suggest bowknots with the ends slanting downward. This prominent characteristic will nearly always be sufficient for the identification of the fern. The pinnules are set obliquely on the midrib, and the indusia have no glands. The frond is oftenest twice pinnate, commonly light yellowish-green, somewhat coarse in texture, and deeply veined on the upper side. It is an evergreen, and grows in partly shaded places near rocks.

This type form of *spinulosum* has been described somewhat carefully for the reason that it is likely at first to be confounded with its more common variety, *Aspidium spinulosum* var. *intermedium*. Nevertheless they are unlike in almost every feature that has been mentioned. To be sure, the lobes of the pinnules of the variety *intermedium* have spines, and the outline is somewhat like that of the type. There the resemblance ends. The pinnæ are set on the rachis at an angle varying from sixty degrees at the top of the blade to ninety degrees at the bottom. The largest pinnules on the lowest pair of pinnæ are not the basal ones, but next to them, and there is no suggestion of a bowknot. The pinnules are nearly at right angles with the midrib, and the indusia have glands, which can be seen best just before the indusia begin to shrivel. Indeed, the indusia pass away so soon that the sori appear naked. The frond is oftenest thrice pinnate, very dark green, fine and lace-like in texture, and loves the deepest shade. Seldom have I found it outside of dense, dark woods. When this description is compared with that of the typical *spinulosum* not much resemblance will be seen.

The next variety of *Aspidium spinulosum* is *dilatatum*, easily distinguished by its great breadth and thrice-pinnate divisions; that is, the pinnules are divided to the midrib. The type form is only twice pinnate.

The Crested Shield Fern, *Aspidium cristatum*, is one of the most beautiful of our native ferns. The frond is linear-oblong or lanceolate in outline and twice pinnate; the pinnæ are short, thick, and triangular, and the flat sori are larger than those of any other member of the family in our region. This fern is an evergreen, not very common, and bears transplanting well.

Aspidium Boottii, though now recognized as a distinct species, was formerly considered a cross between *A. cristatum* and *A. spinulosum* var. *intermedium*. It resembles *A. cristatum* in its general shape, erect habit of growth, and triangular lower pinnæ. It is like var. *intermedium* in regard to its thrice-pinnate divisions, thin texture, glandular indusia, dark green color, and spinulose-toothed pinnules set on the midrib nearly at right angles with it. It is much taller than either *cristatum* or *intermedium*. The fact that the spores are sterile is strong evidence of its being a cross. It is a rare fern, probably on account of its sterility.

Aspidium marginale is one of our most attractive evergreen ferns. The frond is graceful, but firm in texture; the upper surface is noticeably bluish-green, and the under surface very gray. The pinnæ taper to long points and curve upward, and the pinnules bear on their margins elevated sori resembling apple tarts. Indeed, they are so high that when placed in the sun they cast long shadows on the pinnules. The shield-shaped sori being situated on the margins of the pinnules, the name *Aspidium marginale* is most appropriate. Its thick, leathery texture qualifies it for an evergreen, and this, added to the fact that it is easy to raise, makes it a fern of the first quality for the fernery. It has been growing vigorously for seven years in the George Putnam School Garden. The chaffy brown scales that cover the undeveloped crosiers in early spring persist on the stipes when the fronds are fully developed.

A fern that partakes of the characteristics of both *Aspidium cristatum* and *Aspidium marginale* was discovered in 1880 by Raynal Dodge, of Newburyport. Mr. Davenport has raised and studied it for three or four years, and with the best of reasons has declared it to be a cross between the species named above. The upper part of the frond is exactly like that of *A. marginale*, while

the lower part is like that of *A. cristatum*. Moreover, the root-stock is erect like that of *A. marginale*, while the texture and venation are like those of *A. cristatum*. Again, the crosiers being thickly covered with light brown scales, and the indusia being convex, it is like *A. marginale*.

If so well-marked a species can be found in a region supposed to be thoroughly searched, other hybrids, varieties, or even species, may be discovered by some diligent observer.

The native evergreen fern that holds the first place is the Christmas Fern, *Aspidium acrostichoides*. It is sword-shaped in outline, thick and leathery in texture, glossy dark green in color, and produces its sori on the contracted upper pinnæ, though the tips of the lower pinnæ sometimes have sori. The pinnæ are generally entire, slightly toothed and scythe-shaped, and at the base on the upper side have a decided heel; but in the variety *incisum* the pinnæ are cut into pointed lobes. This variety seems to be permanent, since one in the George Putnam School fernery has shown the characteristic marks for four or five years without intermission. The Christmas Fern grows in well-shaded places, and when the fronds come up through the snow in the woods the glossy, dark green clumps are in striking contrast with the white snow. In Canada especially it often grows in immense clumps. The crosiers are covered with a silky white glistening coat, and are the most fantastic, not to say decorative, looking crosiers that I have seen.

The Asplenium Family. — Next in importance to the Aspidium family is the Asplenium family, and the member seen most frequently is the Lady Fern, *A. Filix-fœmina*. One can hardly say where it does not grow, it is so common. It may be distinguished easily by its fruit dots, which sometimes are straight and sometimes curved like a horse-shoe, and soon run together, forming dense dusty brown patches on the under side of the pinnules. The frond when growing in the shade is ovate lanceolate, but in places exposed to the sun it changes its form so much as to appear to be a different species. In the latter case the pinnæ curve upward in a vertical direction, and the pinnules stand back to back as if to repel all hostile forces in the form of wind, cold, rain, and the heat of the sun. Professor D. C. Eaton called this form var. *angustum*.

The fern puts itself in this attitude to protect itself from the

too intense rays of the sun, which cause too rapid transpiration of moisture from the foliage. It often grows by the side of roads on dry gravelly banks where there is but little moisture, and if by reason of a hot sun there is too rapid transpiration of moisture from the foliage the roots cannot take up enough to supply its place, and the frond wilts and perhaps dies. Other ferns have the habit of drawing their parts together for protective purposes, as, for example, the Flowering Ferns, which will be considered later.

The most striking illustrations of this habit of taking a protective position are found in the so-called Compass Plants, *Lactuca Scariola*, which grows in Europe, and *Silphium laciniatum*, a Western plant. Their broad surfaces face the east and west points, while the edges of the leaves extend north and south. So constant is this habit that in former years hunters and travellers were accustomed to be guided by the position of the Silphium leaves in their wanderings over the trackless prairies.

Probably there are more varieties of the Lady Fern than of any other fern on the earth. Many of them have been found growing wild, but by far the larger number have been produced by sowing varieties of spores together. In England, Lowe, Moore, and Clapham, especially, have spent a large part of their lives in producing such varieties. Mr. Lowe, during a period of fifty years, has produced at least four hundred varieties of the Lady Fern, some of which are very remarkable. By looking at the type form again we can better appreciate the remarkable changes in form to be seen in the varieties. The variety *corymbiferum* presents an extraordinary example of pinnæ forking at the ends again and again, until the end of every pinna becomes fan-shaped or takes the form of a corymb, whence the name *corymbiferum* (bearing corymbs). This variety was found growing wild on the Island of Guernsey, one of the Channel Islands. The variety *acrocladon*, found growing wild near Howard Castle, England, by Mr. Clapham, shows still more remarkable variations from the type form. It takes an arborescent form and resembles an elm tree flattened out. The subdivision of the rachis so as to simulate the branching of a tree is unique.

The variety *Fama* was originated by Mr. Lowe. It is quite remarkable for the bifurcation of the rachis and of each pinna. The pinnæ are widely separated and the pinnules are much contracted.

Hebe, another variety originated by Mr. Lowe, shows a stronger tendency to bifurcate, especially at the top and on the lower pinnæ, which are noticeably lax. The bifurcation is repeated, until each of the lower pinnæ terminates in a crest. *Multifidum*, originated by Mr. Lowe, has the pinnæ the usual distance apart, but they are very delicate in form and end in many divisions, whence the name *multifidum* (divided many times). The pinnules are extremely regular in arrangement, and gradually diminish in size to the ends of the pinnæ.

I have noticed some remarkable variations in the fronds of the Lady Fern, besides those in the case of fronds growing in exposed places already referred to. There are various degrees of thickening of the frond at the top and of rolling up so as to form a somewhat compact ball of stunted and misshapen pinnæ and pinnules. So many similar forms in other plants are caused by grubs that these fern balls would seem to be caused in a similar manner, but an examination of many specimens has never been rewarded with the discovery of a single grub. The disposition to thicken and bifurcate at the top in case of perfectly erect fronds, then to bend a little in the case of one frond, and more and more in the case of others, seems to show *the nature of the fern* rather than the presence of grubs.

The crosiers of the Lady Fern are scrawny looking things without wool or scales. The stems are commonly blackish-brown, but often lake-red in color, like those of the Royal Fern, but the absence of wool serves to distinguish them.

Asplenium thelypteroides is not a very common fern, but has interesting characteristics. The pinnæ are remarkably acuminate, or long taper pointed. The sori are stitch-shaped and straight. The indusia at a certain stage of growth resemble light blue silk stitches, and, once seen in their most beautiful condition, will make a lasting impression on the memory of the observer. So far as the sori are concerned this fern is one of our best types of the Asplenium family. It flourishes well under cultivation, and needs but little care.

Flowering Ferns. — The Osmundas are called Flowering Ferns because the fruit appears in the same relative position to the frond in which the flowers and fruit of phænogamous plants appear to their respective plants. Flowering plants usually have their flowers at the top of the leafy stem, like the rose bush, or on a stalk separate from the leaves, like the dandelion.

The Royal Fern, *Osmunda regalis*, has its fruit, which looks like a cluster of flowers, on the top of the leafy stem, which is much branched. The whole arrangement is like that of the pink spiræa cultivated in gardens. The foliage bears no resemblance to that of our common ferns, but is more like that of some flowering plant or tree, like the locust. The pinnules look like the leaves of some shrub. It grows to the height of five feet in this country, but in England, which has a moister climate, it reaches eleven feet, and on account of its height and beauty the name Royal Fern is well bestowed. In the shade the branches, both of foliage and fruit, spread or make wide angles with the rachis; but in exposed places the branches take a position nearly vertical, at the same time drawing pinnules and fruit clusters together. The crosiers are clothed with wool slightly varying from white, and the stems are of a beautiful lake-red color. If various crosiers covered with wool are seen growing together in spring in the same locality those with lake-red stems may be known as Royal Ferns in the process of developing.

Osmunda Claytoniana has the fertile pinnæ midway of the frond, and so is called the Interrupted Fern. The fertile pinnæ differ much in number and mode of fruiting. Sometimes there is only one pair, then one and a half, then two, and so on up to five pairs. The globose sporangia are arranged in circular uncovered bunches on the much contracted pinnules, which are occasionally flat, but commonly dense and cylindrical. This fern also has the habit of spreading its pinnæ when it grows in the shade, and elevating them so as to make a sharp angle with the rachis when growing in the sun. This illustrates another attempt to prevent too rapid transpiration of moisture from the foliage. Magnificent specimens of this fern grow in Hyde Park. It has been grown successfully in the George Putnam School Garden for six or seven years. The crosiers are clothed with nearly white wool, and are as beautiful as any growing in this region.

The blade is often light yellowish-green, especially when young, and droops gracefully, so that there is little need of confounding it with the third species of Osmunda, the Cinnamon Fern, *Osmunda cinnamomea*, which is stiff, erect, and dark green in color, and the pinnæ nearly always make a noticeable angle with the rachis, but in open places the angle is quite sharp. There is a little tuft of brown wool where the pinnæ join the rachis,

which serves to distinguish a frond of the Cinnamon Fern from one of the Interrupted Fern. The fertile fronds are much shorter than the sterile, and soon wither and fall down in a limp, straggling way. As a rule the fruit is on a stalk by itself, and clustered together in the form of a club; but I have found in the same clump many unsuccessful attempts to form fruit. The crosiers are covered with wool slightly cinnamon-colored, and so they are prepared to start from the ground in spring among the very foremost.

The Onocleas. — The Sensitive Fern, *Onoclea sensibilis*, is exceedingly common. Except on high land it grows wherever ferns grow — in woods, open fields, pastures, meadows, and along stone walls. It is not sensitive about the location of its home, provided it is not dry.

Ordinarily the fruit does not appear on a leaf-like form, but on a stalk by itself. It consists of small berry-like forms arranged on stiff, straight branches. These spheroidal forms contain the sporangia, or spore cases. The fertile frond is a much modified form of the broad, unfertile foliate frond. Sometimes the modification is only partly completed on either side of the rachis, and sometimes it is complete on one side and incomplete on the other. In a small area, perhaps thirty feet square, I have found a complete graded series of modifications, from the expanded sterile frond to the complete fertile frond. These imperfectly fruited fronds have been called variety *obtusilobata*, but, since they are very variable and uncertain to appear again in the same place, they do not deserve to be so classed. They are simply unstable variations, such as are seen in the growth of Clayton's Fern and the Cinnamon Fern; but they present a valuable lesson in morphology; they illustrate how seed vessels generally are formed from leaves.

The Sensitive Fern has a most ancient pedigree, having come down to our time, unchanged in form, from a period half a million years back. It is older than the Rocky Mountains or the Himalayas, and is supposed to have come into existence during the Chalk age, before mammals appeared on the earth. Sir William Dawson places it in a later period, the Eocene, and says it is found in great abundance in the Laramie beds in the West.

The Ostrich Fern, *Onoclea Struthiopteris*, is appropriately named, since both the fertile and sterile fronds resemble ostrich feathers. The sterile fronds taper downward in a marked manner,

like those of the Mountain Fern, but the frond is two or three times as large as that of the Mountain Fern, and the lower pinnæ are comparatively near together. The fertile fronds are much shorter than the sterile, and look like silk twist. They suggest a buttonhole, or a piece of embroidery worked with lustrous brown silk. The crosiers are without wool or scales and keep their rolled-up form until the lower pinnæ are well developed, and the frond has attained a considerable height.

This is the giant among our native ferns. In Canada I have found it growing seven feet high. It is entirely hardy and easy of cultivation. One planted in the fernery of the George Putnam School years ago has spread widely and given the pupils many opportunities to observe its development "from start to finish."

The Rock Fern. — The Common Polypody, *Polypodium vulgare*, is often called the Rock Fern, because it is nearly always found growing in a thin layer of loose leaf-mould on rocks. The layer may be two inches thick, and can be readily stripped from the rocks, bringing the fern with it. Planted in ordinary soil away from rocks it languishes and gradually dies out. The term "polypody" means many-footed, and refers to the numerous branches of the rootstock. A characteristic mark of a Polypodium is the absence of indusia in the sori. This characteristic of the Polypodys is well illustrated by *Polypodium aureum*, the Golden Polypody of Florida. This fern grows naturally on the cabbage palmetto, but it is a beautiful fern for house culture, as proved by Mrs. Richards, who has grown it for years. The large, naked sori are remarkable. Other ferns have sori without indusia, but their fronds have not the shape of Polypodium fronds.

Beech Ferns. — We have three species of *Phegopteris* whose sori have no indusia. The first is *Phegopteris polypodioides*, whose fronds are triangular in outline, or shaped like an arrowhead. The lowest pair of pinnæ are deflexed and stand forward. These marks will serve to distinguish the species from all others. The sori are small, naked, and situated near the margins of the lobes of the pinnæ. This fern grows in bushes and woods of various kinds, and in great profusion in Northern New England and Canada.

Phegopteris hexagonoptera is closely allied to the species just mentioned, but it is relatively much broader — in fact, broader than it is long. It is not one of the common ferns, nor is it especially rare; but it is common southward.

The Oak Fern, *Phegopteris Dryopteris*, has three well-marked divisions which are more or less triangular in shape. It is a small fern, averaging six or eight inches in height. There seems to be no special reason why it should be called the Oak Fern, since it commonly grows in any kind of woods, — pine, maple, and birch, as well as oak and beech.

The Maiden-hair Fern. — Although many species of Maiden-hair Fern are cultivated in this region, and many have been exhibited in Horticultural Hall at intervals for many years, there is only one native species growing in New England, and that is *Adiantum pedatum*, a very graceful and beautiful fern. It has not been my good fortune to see much of it in Massachusetts, but in the Province of Quebec I have seen it growing over large areas. It grows in moist woods, and has the peculiar property of repelling rain or moisture from its foliage, as the jewel-weed does; hence the name Adiantum, which means *unwetted*. The stipes are black and shining and the sori are marginal, the margins of the lobes being reflexed to form indusia. I have raised the fern in several places, but it does not flourish well for a number of years.

Bladder Ferns. — The Bladder Fern takes its name from the inflated indusia of the sori. There are two common species; but they are not as common about here as most of the ferns already mentioned. In the Province of Quebec they are found in luxuriant abundance. The narrow drooping fronds of *Cystopteris bulbifera*, the Bulb-bearing Bladder Fern, are often three feet long, although the length, as given by Gray and Underwood, is from one to two feet. This fern is peculiar from the fact that besides sori it bears small bulbs, about as large as a small pea, on the under side of the rachis. New ferns grow from these bulbs, thus simulating the one-step development of flowering plants. The little bulbs are ferns in embryo, and they fall to the ground and there take root in the same manner as the axillary bulbs of the tiger lily do.

The Fragile Bladder Fern, *Cystopteris fragilis*, is a small species, rarely exceeding eight inches in length. It commonly grows in densely shaded spots in the crevices of rocks. The fruit dots are small, and the bladder-shaped indusia are circular at one end and pointed at the other. It matures early, being out of good condition by August. I have raised it without difficulty five or six years, though it does not increase.

The Woodsia. — Another little fern which loves the crevices of rocks is *Woodsia Ilvensis.* It often grows in exposed places, but manages to keep comfortable by growing in dense clumps and covering itself with thick brown bristles. I have seen it growing in the greatest abundance in Canada, but it is also common in New England. The sori of Woodsia are generally peculiar from having the indusia in long ribbon-like strips coming from under the sporangia, instead of being over them, as is commonly the case.

The Walking-leaf Fern. — The *Camptosorus rhizophyllus*, or Walking-Leaf, according to Gray is found from west New England to Wisconsin and southward. I have found it abundant on lime rocks in the latitude of Quebec. The generic name *Camptosorus* means *bent sorus*, referring to the curved sori; the specific name, *rhizophyllus*, means *leaf-rooted.* The fronds have long tapering points which bend down to the earth and take root in the manner of a strawberry runner. The process is repeated, and thus the rooting leaves or fronds seem to walk over the ground, but at an exceedingly slow pace.

Dickson's Fern. — The last fern to be noticed is the very common *Dicksonia pilosiuscula*, named for James Dickson, an English fernologist. It is the most delicate and lace-like fern that we have. I used to confound it with the Lady Fern if I saw it at a distance, but one look at the sori, which are very small, cup-shaped, and situated in the sinuses of the pinnæ, served to distinguish it from the Lady Fern, which has conspicuous curved sori. There are many species of *Dicksonia* in other parts of the world, but we have only this one.

Fern Localities. — High Falls in the Province of Quebec is a place remarkable for ferns. Coming this way almost to the Vermont line, on the South-eastern Railway, we find the little village of Glen Sutton, or "The Glen" as it is commonly called by the people of the vicinity. It is situated in a beautiful valley surrounded by mountains, from whose sides run many small perennial streams which have cut deep channels for themselves in the rocky declivities. The sides of these channels are wonderfully rich in ferns of nearly every common species. It was here that Edson, one of the best artists in Montreal, used to come to paint. It is no discredit to the comfortable hotel or the boarders to state that board is two dollars and half a week. Still farther this way, just over the line, in New Hampshire, is Colebrook, whose mountains are wonderfully rich in ferns.

Another beautiful place abounding in ferns is Bridgton, Me., which is on a chain of beautiful lakes, one of which, Highland Lake, resembles Lake George. On the very edge of this lake are fine groves abounding in ferns. Within an area one hundred feet square were a dozen species growing luxuriantly. Going by the path through the opening on the other side into the field a few rods, I found the numerous variations of the Sensitive Fern. A little farther on by the side of the road the variations of the Lady Fern were gathered; and a little farther away on the other side of the same road the variations of the Cinnamon Fern grew.

Here the consideration of ferns today closes; but if any listener wishes to become acquainted with ferns to almost any extent he should become a member of the Massachusetts Horticultural Society. Here he will always find help from competent botanists, sumptuous books, and the fine collection of pressed ferns presented to the Society by Mr. Davenport.

BUSINESS MEETING.

Saturday, April 2, 1898.

A duly notified Stated Meeting was holden at eleven o'clock today, the President, Francis H. Appleton, in the chair.

The President submitted to the meeting the following amendment to the Constitution and By-Laws, which was read twice and by a majority vote ordered to be entered on the records for consideration at the Stated Meeting on the first Saturday in July:

SECTION XVII, A.

Committee on Forestry and Roadside Improvement.

A Committee on Forestry and Roadside Improvement, of five members, shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, to securing the planting of trees, and the preservation of those already planted, upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall, with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more

efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may have placed at its disposal.

The President appointed as the Committee on School Gardens, School Herbariums, and Children's Herbariums the following-named members:

Henry L. Clapp, *Chairman.*

Mrs. H. L. T. Wolcott,	Mrs. P. D. Richards,
George E. Davenport,	William P. Rich,
Miss Katharine W. Huston,	W. E. C. Rich, *Secretary.*

The President announced that James H. Bowditch would be unable to serve on the Special Committee on Forestry, and that he had appointed J. Woodward Manning in his place.

William H. Spooner announced the decease of Hon. John Simpkins, and moved that a Committee be appointed by the Chair to prepare a memorial of him. The motion was carried, and the Chair appointed as that Committee Professor Charles S. Sargent, Ex-President William H. Spooner, and Professor Benjamin M. Watson.

Joseph H. Woodford made a similar motion in regard to Fearing Burr, who died on the fourth of October, 1897. This motion also was carried and the Chair appointed as the Committee George Lincoln, Edmund Hersey, and Starkes Whiton.

The Secretary announced the receipt of a letter from Mrs. Sophia E. Copeland, acknowledging the receipt of the memorial of her brother, Edward C. R. Walker, and expressing her appreciation of the sympathy of the Society.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

George M. Morgan, of Boston,
George H. Sutherland, of Roslindale,
Harlan P. Kelsey, of Boston.

Adjourned to Saturday, May 7.

MEETING FOR LECTURE AND DISCUSSION.

THURSDAY, April 21, 1898.

A lecture was delivered this evening, in the Society's Hall, before the Massachusetts Horticultural Society and the Appalachian Mountain Club, FRANCIS H. APPLETON, President of the former Society, in the chair. President Appleton welcomed the Appalachian Club to the Hall, and introductory remarks were also made by Professor William H. Niles, President of the Appalachian Club.

The following is an abstract of the botanical part of the lecture:

THE WILD FLOWERS OF THE CANADIAN ROCKIES AMIDST THEIR NATIVE SURROUNDINGS.

By CORNELIUS VAN BRUNT, of New York.

A trip over the Canadian Pacific Railway, from Montreal to Vancouver, is one of the most delightful to be imagined; and the variety of the scenery and the beauty and novelty of the flora make one's enjoyment increase each day. Last year we took this trip, going in the early part of July and returning the first of September, that we might photograph the flowers then in bloom. East of Lake Superior the flora was mostly familiar to us. Farther west, on the prairies, the flowers were especially brilliant and beautiful.

Banff was our first stopping-place. After the beautiful mountain scenery the thing that most impresses the stranger is the abundance and brilliancy of the flowers and their habit of growing in large communities, as it were. A hill blue with bluebells, a swamp vivid scarlet with painted cup or brilliant magenta with fireweed, are the rule, not the exception. The most striking novelty about the Banff Hotel early in July is the *Zygadenus elegans*, of the lily family, a beautiful white flower growing in great abundance on swampy ground. A swamp near the hotel, which had, earlier in the season, been filled with lady's-slippers, habenarias, arethusas, and other orchids, now showed myriad specimens of *Tofieldia glutinosa*, the parnassia, senecio, campanula, castilleia, and potentilla. *Potentilla fruticosa* might at a first glance be mistaken for a wild yellow rose, so large are both the bush and the flowers. The wild rose of that locality — *Rosa*

acicularis var. *Bourgeauiana* — was about through its blooming season. It had covered large areas and must have been very beautiful. Blue clovers, instead of red, white, or yellow, were also a novelty to us. The color of one of these, *Astragalus adsurgens*, varied from bright blue to purple and violet, and was most effective. Other plants resembling blue clover were *Astragalus hypoglottis*, *Oxytropis viscida*, and, most beautiful of all, *O. splendens*, a superb rose-purple head and leaves resembling silvery colored velvet.

In July the Leguminosæ seemed the best represented family. There was the beautiful rose-purple of the *Vicia truncata*, which twines about everything, white and pink *Hedysarum boreale*, *Oxytropis Lambertii*, both white and pink, the graceful and very fragrant *Lathyrus ochroleucus*, with cream-colored flowers and trailing habit, and the brilliant magenta *Hedysarum Mackenzii* — these are a few members of the Pea family in bloom during July. *Phaca Americana* was in seed, but almost as handsome as when in flower. A superb blue vetch, which has not yet been identified, grew in masses on the shore at the junction of the Bow and Spray rivers. Under the coniferous trees near Banff the ground is fairly carpeted with *Linnæa borealis*. With it were the dwarf cornel, the one-flowered pyrola (*Moneses grandiflora*), and also *Pyrola secunda*, *P. chlorantha*, and *P. rotundifolia*. These grew in dry places, but in wet, shady spots the pink pyrola (*P. uliginosa*) was abundant. With it we found *Pinguicula vulgaris* and the delicate unobtrusive brown lily (*Stenanthium occidentale*), which has a delicious fragrance.

The Bow River Valley, through a glass, looked as yellow as gold, and we found that the hue was due to the abundance of *Gaillardia aristata*, which resembles our *Rudbeckia hirta*, though it is more brilliant.

A most noticeable shrub is *Shepherdia Canadensis*, with its vivid scarlet or translucent yellow berries. *Allium cernuum* and its more noticeable relative, *A. Sibiricum*, cover large patches of dry hillside. In shady, moist nooks *Parnassia palustris* had taken a strong foothold, and a little later in the season the more beautiful *P. fimbriata* appeared.

The season is so short in this latitude that haste is very necessary if the flowers would fulfil their mission in this world; and in consequence they bloom and fade away with the most con-

fusing rapidity. Spring flowers and summer flowers and autumn flowers all bloom together, and in such an energetic fashion that we marvel not only at their vigor, beauty, and abundance, but even more at the apparently intelligent comprehension of the necessity for speed. A showy weed is the strawberry blite (*Chenopodium capitatum*); and the Northern bedstraw, pink yarrow and white, pearly everlasting, and the pink everlasting are abundant in the open woods and along the roadsides. In shady places along streams several purple asters grew thriftily, the most showy being *Aster Fremontii;* and along the wet margins of the Bow River is found *Spiranthes Romanzoffiana* in great abundance and beauty. Great clumps of *Pedicularis Grœnlandica* brighten the banks of the Bow River with long spikes of magenta bloom. The pretty but less showy *Pedicularis bracteosa* is more abundant in wet woods. There are two gentians — the little *Gentiana acuta*, which is a pale lavender, and the sturdy, somewhat coarse *G. Forwoodii*, which is a deep blue, flecked on the corolla lobes with yellow. Along this river also is found that most beautiful flower, the shooting star (*Dodecatheon Meadia*).

Banff owes much of its popularity to the hot sulphur water that issues from Sulphur Mountain. The Government owns many of these springs. The hot overflow from the Government baths, known as the Cave and Basin, makes ponds which do not freeze over in winter, and on their borders are found plants which belong to a different latitude. Among these are the smaller fringed gentian (*Gentiana detonsa*) and *Lobelia Kalmii*, not only blooming ahead of time, but most of them growing in the warm water. One of the excursions to be made from here is to the "Hoodoos," — curious rock formations, — and on a smooth, sandy plateau near by were three kinds of flowers which nearly covered the ground — *Anemone patens* var. *Nuttalliana*, best known as the pasque flower, *Campanula rotundifolia*, and *Hedysarum Mackenzii*. The sandy roadway for a considerable distance was covered with a curious weed of the mustard family, *Physaria didymocarpa*, or bladder-weed. This derives its common name from the seeds being enclosed in woollen bladder-like sacs.

A striking feature of the National Park landscapes is the squirrel or fox-tailed grass, *Hordeum jubatum*. Clumps of it are found almost anywhere, but sometimes it takes possession of considerable areas of level ground, and, waving in the wind on a sunshiny morning, is one of the most beautiful pictures imaginable.

On a drive to Devil's Lake we collected blue flax, larkspurs, red anemone, and *Geum triflorum*. These grew on level spaces a little removed from the road. The roadsides proper were crowded with bluebells, fireweed, golden-rod, *Artemisia frigida*, erigerons, — pink, blue, and purple, — *Spiræa betulæfolia*, troximons, gaillardias, pink, white, blue, and purple peas, pearly everlasting, and pink and white yarrow.

The summits of Sulphur and Tunnel mountains were the abode of many small Alpine plants, mostly saxifrages and heaths.

From Banff to Laggan is but a few miles. The railroad skirts the Bow River, whose banks were brilliant with painted cup, fireweed, and patches of the Western red lily (*Lilium umbellatum*), just out of bloom. The swamps of Lake Louise were covered with beautifully colored sphagnum, and earlier in the season orchids had been abundant. The woods were filled with a great variety of fungi, many of which were brilliantly colored and fantastically shaped. Lichens covered everything available, and the mosses were exquisite and sometimes very curious. Lake Louise is the most beautiful place imaginable, combining mountains, forest, snow, glaciers, water, and sky in such proportions as to make it the perfection of scenery. The forests of coniferous trees, mostly spruces, are dark and dense with long beards of gray moss falling from their lower branches. The forests about Lake Louise have the advantage of having escaped fires. The most characteristic tree of the Canadian Rockies is neither the balsam nor the spruce, but Lyall's larch, which is found nowhere else. This is the last tree before reaching the snow-line. Its needles being deciduous and turning to a bright yellow before falling, a very noticeable band appears in August above the dark foliage of the evergreens.

The plants most noticeable about Lake Louise in August were Labrador tea, the white rhododendron, and *Kàlmia glauca*. Cotton-grass covered the glacial meadows at the head of Lake Louise, and here was also *Epilobium latifolium* growing abundantly. *Senecio triangularis* grew on the steep sides of the valley, and was the only species of senecio seen, though at Banff there were several. Here were also seen *Saxifraga Lyallii*, fireweed, yellow columbine (*Aquilegia flavescens*), the blue (*A. brevistyla*), and the red (*A. formosa*).

A pretty little anemone (*A. parviflora*) bloomed almost in the

snow. Still farther up the valley, on the lateral moraine, a flower garden awaited us. Masses of purple pentstemons, the pink moss campion, the night-blooming catchfly, *Dryas Drummondii*, *Castilleia pallida*, small species of potentilla, a dwarf bluebell, and specimens of a large rankly growing yellow thistle covered the steep slope. At Mirror Lake we found *Arnica cordifolia*, brilliant yellow and delightfully fragrant, *Valeriana sitchensis*, and erigerons more beautiful than any we had yet seen. In the woods near Mirror Lake were the lovely pink bells of *Bryanthus empetriformis*, and at the upper lake — Lake Agnes — *Cassiope tetragona* and *C. hexagona*. The last pitch of the climb to Lake Agnes was made beautiful by the Alpine flowers — *Saxifraga bronchialis*, *Sedum stenopetalum*, etc. Castilleia, pentstemons, and columbines were everywhere. All around these lakes, wherever there is moisture enough, is found the most beautiful of all the wild flowers — *Myosotis sylvatica*, the forget-me-not.

Leaving Laggan, we proceeded to Glacier through the most beautiful scenery. Here the trees increased in size, and one would hardly recognize them as the same species that we had seen in the Rockies — Engelmann's spruce, Patton's hemlock, the Douglas fir, the white pine, balsams, and flat cedar. In fact, these were all we had seen in the Rockies, except Lyall's larch. These forests are as difficult to penetrate — off the trail — as a tropical jungle. One of the worst obstacles to progress is the devil's club (*Fatsia horrida*), — a plant of the Ginseng family, — five or six feet tall, with countless sharp spines. Another barrier to progress is furnished by the alders, whose low branches are prostrate and spread in every direction. The bushes grow as compactly as a cultivated hedge and are as impassable. The flowers still in bloom at Glacier were few, several saxifrages, *Tiarella unifoliata*, painted cup, fireweed, crimson and yellow monkey flowers, etc. On the snow-sheds were many plants common to the East. Plants new to us were the goat's-beard spiræa, salmonberry, and a little claytonia. We saw in fruit, *Actæa spicata*, *Streptopus amplexifolius* and *S. brevipes*, and *Smilacina racemosa*. We found a most delicious blueberry and an abundance of raspberries.

Much interest was added to the lecture by stereopticon views of mountain scenery and flowers, the latter colored by Mrs. Van Brunt.

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ERRATUM.

On page 145 March 12 should be March 19.

EXPERIMENT STATION REPORTS WANTED.

The Massachusetts Horticultural Society is endeavoring to collect complete sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station). — Bulletins 4–6 (1884), 7–10 and 1–4 (1885), and 5–9 (1886). 7th Annual Report, for 1894.

Alabama (Canebrake Station). — All bulletins later than 18, and all Annual Reports later than the 3d, for 1890.

Arizona. — 4th Annual Report, for 1893.

Arkansas. — Bulletin 1. All Annual Reports later than the 4th, for 1891, except the 8th, for 1895.

California. — Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado. — Bulletin 3.

Connecticut (New Haven Station). — Bulletins 1 to 67, inclusive. Annual Reports for 1877 to 1883, inclusive, except that for 1878.

Indiana (Purdue Univ. School of Ag.). — Bulletin 1. College Reports 1 to 14, inclusive.

Kentucky. — Bulletin 10.

Michigan. — 6th Annual Report, for 1892–93. (Contained in Report of Michigan Board of Agriculture, 1893.)

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, 26, and 33 of Old Series. All Annual Reports since the 1st, for 1888, except that for 1897.

New Jersey. — Bulletins 1, 4, 5, 15, 27, and 28.

New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. 1st to 7th Biennial Reports. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota. — 4th Annual Report, for 1893.

Ohio. — All Bulletins of First Series, except 16, 17, 18, and 19.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Bulletin of Information No. 1.

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

Texas. — College Bulletins 1–5, 1883–1887.

West Virginia. — Special Bulletin — Potash and Paying Crops, 1890. All Annual Reports later than the 3d, for 1890.

Wyoming. — Bulletins 2 to 4, 9, and 10.

Ontario Department of Agriculture, Toronto. — Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1898.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

SEE LAST PAGE OF COVER.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, May 7, 1898.

An adjourned meeting of the Society was holden at eleven o'clock, the President in the chair.

A memorial of Fearing Burr, prepared by the Committee appointed for that purpose at the last meeting, was presented by the Secretary and was unanimously adopted, and it was ordered that it be entered on the records, and that a copy be sent to the family of the deceased. This memorial is as follows:

MEMORIAL OF FEARING BURR.

By the sudden death of Mr. Fearing Burr, on the fourth of October last, the Massachusetts Horticultural Society has lost one of its oldest as well as one of its former useful and interested members. His age at his decease was eighty-one years nine months and twenty-three days. He was elected a Life Member of the Society in 1852, having been proposed for membership by its late Vice-President, George W. Pratt, Esq.

Mr. Burr's horticultural experience began in early life, when he was employed upon the family estate, which covers many acres in the rear of the paternal homestead. The experience thus gained, added to his inherited tastes and subsequent business pursuits as copartner for twelve or more years with his cousin, Matthew H. Burr, under the firm name of M. & F. Burr, Seedsmen, of Boston, undoubtedly gave him creditable notice as a prominent horticulturist throughout the New England States, as well as in more distant localities. His correspondence and dealings with horticulturists and seedsmen from over-sea were not infrequent.

In 1865 he published "The Field and Garden Vegetables of America," a work of 674 pages, octavo. He also was a frequent

contributor upon various horticultural subjects connected with the farm and garden.

Mr. Burr had served this Society upon several of its important Committees, including those on Fruits, Vegetables, etc. He was one of a Committee to visit the Durfee gardens at Fall River, and was the recipient of several of the Society's valuable medals at various times. In 1857 the firm of M. & F. Burr was awarded a silver medal for its display of "Sixty Varieties of Beans, all neatly and correctly labelled." Medals were also awarded him on Burr's sweet corn, hybrids from which are now known under another name.

Mr. Burr was a diligent reader, a good converser and debater; and whatever topics were brought up, either in private or public discussion in which he took part, his remarks were received with attention for their real merit and practical bearing. He was never married. A brother and sister are all that remain of the family, and they will find in the treasures of memory the richest memorials of the many virtues which were the ornaments of his character.

Respectfully submitted by

GEORGE LINCOLN,
EDMUND HERSEY,
STARKES WHITON,
} *Committee.*

William C. Strong announced the decease of Ex-President James F. C. Hyde, and read the following memorial, which he had prepared:

MEMORIAL OF J. F. C. HYDE.

In the decease of Hon. J. F. C. Hyde, on the second instant, the Massachusetts Horticultural Society is called upon to mourn the loss of one of its earliest, most active, and constant members. For fifty years he has taken an interest and a prominent part in its exhibitions and in the administration of its government. With a natural fondness for the cultivation of the soil, he first engaged in the nursery business, and developed in an unusual degree a love for fruits and flowers, with a keen and critical appreciation of their quality, so that he was soon recognized as an authority in their nomenclature. For this reason he became at once a valued member of this Society, and for several years he served as Chairman of the Fruit Committee. In the year 1859

he was chosen a Vice-President, and served until the year 1866, when he was elected President, serving in this office for four years. He had marked success in the cultivation and exhibition of strawberries and other fruits, and also in seedling gladioli, carnations, sweet peas, and various other flowers, in the improvement of which he was an enthusiast. His example in finding delight and relief from the pressing activities of business and political life in the selection of best varieties, and in raising the standard of cultivation in the garden and orchard, was conspicuous and worthy of all imitation. It is with grateful emotions that we recall the good and useful work which he has done, the influence of which will live though he has passed on.

Of the many other important public services which Mr. Hyde has rendered in other fields of usefulness it is not our province to speak. But in his connection with this Society, which contributes so largely and so directly to the welfare of the community, we desire to express hearty testimony to his very great ability, enthusiastic devotion, and valuable service. It is, therefore,

Voted, That this testimonial be entered upon the records of the Society, and that a copy thereof be sent to the family of our deceased friend, with the assurance of our deep sympathy with them in their and our loss. The remembrance of his active and faithful life of service will be a precious and abiding legacy to them, and we trust will give a bright assurance of a higher immortal life.

The above memorial was unanimously adopted.

The President announced that Charles S. Sargent would be unable to serve as Chairman of the Committee to prepare a memorial of the late Hon. John Simpkins, and that he had appointed Hon. Charles F. Sprague to fill the vacancy.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Frederick H. Kennard, of Brookline.
William Endicott, 3d, of Boston.
Mrs. George P. Sanger, of Boston.
Frank Brunton, of Boston.

Adjourned to Saturday, June 4.

BUSINESS MEETING.

SATURDAY, June 4, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

No business being brought before the meeting it was
Dissolved.

BUSINESS MEETING.

SATURDAY, July 2, 1898.

A duly notified Stated Meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following amendment to the Constitution and By-Laws, introduced at the Stated Meeting on the second of April, and then ordered by a majority vote to be entered on the record, came up for final action, and having received a two-thirds vote, was declared adopted:

SECTION XVII., A.

COMMITTEE ON FORESTRY AND ROADSIDE IMPROVEMENT.

A Committee on Forestry and Roadside Improvement of five members shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, to securing the planting of trees, and the preservation of those already planted, upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall, with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on Forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may place at its disposal.

The following named persons were then, agreeably to the above section of the Constitution and By-Laws, elected a Standing Committee on Forestry and Roadside Improvement:

HARVEY N. SHEPARD, *Chairman.*
NATHANIEL S. SHALER, JOHN G. JACK,
J. D. W. FRENCH, JAMES H. BOWDITCH.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation, adopted at the meeting of the Committee on the 30th of April, that the Society appropriate $150 for the use of the Committee on Forestry, etc. The appropriation was unanimously voted.

WILLIAM THATCHER, of Brookline, and
JOHN A. PETTIGREW, of Jamaica Plain,

having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected.

The following named persons, recommended by the Executive Committee, were elected Corresponding Members of the Society:

PETER BARR, of London, England.
JOHN GILBERT BAKER, F.R.S., F.L.S., Keeper of the Herbarium of the Royal Gardens, Kew, England.
F. W. BURBIDGE, M.A., Curator of Trinity College Botanic Gardens, Dublin, Ireland.
F. W. MOORE, Director of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.
ARCHIBALD F. BARRON, Turnham Green, London, W., England.

Adjourned to Saturday, August 6.

BUSINESS MEETING.

SATURDAY, August 6, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, Vice-President SAMUEL HARTWELL in the chair.

The Chair announced the following named Committee, appointed by the President, agreeably to the Constitution and

By-Laws, to nominate candidates for Officers and Standing Committees of the Society for the year 1899:

William H. Spooner, *Chairman.*

Benjamin M. Watson,	Patrick Norton,
Samuel Hartwell,	Azell C. Bowditch,
Benjamin P. Ware,	Charles F. Curtis.

It was voted that the Nominating Committee be empowered to fill any vacancies that might occur in their number.

The Secretary laid before the meeting a letter from John Gilbert Baker, Keeper of the Herbarium and Library of the Royal Botanic Gardens, Kew, England, expressing his sense of the high honor conferred on him by electing him a Corresponding Member of the Society.

Adjourned to Saturday, September 3.

BUSINESS MEETING.

SATURDAY, September 3, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, President APPLETON in the chair.

William H. Spooner, Chairman of the Committee appointed at the last meeting to nominate candidates for Officers and Standing Committees for the year 1899, reported a printed list, which was accepted. It was voted that the Committee be continued and requested to nominate candidates to fill any vacancies that might occur before the election.

The Secretary presented a memorial of Hon. John Simpkins, prepared by Hon. Charles F. Sprague, Chairman of a Committee appointed for that purpose. The memorial, which was unanimously adopted, is as follows:

MEMORIAL OF HON. JOHN SIMPKINS.

The Honorable John Simpkins was born in New Bedford, June 27, 1862. He spent his early years in Yarmouth, and laid the foundation of a healthy physique, which later made him distinguished as an athlete. He attended St. Mark's School, and went to Harvard, where he spent four years, graduating in the class of 1885. During his collegiate career he was one of the most popular men, and his sunny and cheery disposition brought

him many life-long friendships. He was also a first-class foot-ball player, and was ever in the thickest of the contest, and one of the most valuable men on the team.

He was always devoted to the Cape District, and spent all his leisure hours there, and, taking a great interest in horticultural matters, he exhibited many and various plants, chiefly chrysanthemums, and those of an aquatic nature, and took many prizes in the exhibitions of the Massachusetts Horticultural Society.

He took a great interest in public matters, and in 1891 and 1892 was elected to the State Senate as a Republican, and, although opposed to the Hon. William E. Russell on political grounds, enjoyed the firmest personal friendship with him during his term of service. In 1892 Mr. Simpkins was chosen a Presidential Elector, and in the same year was elected President of the Republican Club of Massachusetts, succeeding the Hon. Roger Wolcott. His course, while acting in this latter capacity, made him very popular with the members of the Club, and brought out his powers of organization, for which he was particularly distinguished.

In 1894 there was a call from the Cape end of the Thirteenth District that it should have a Representative in Congress, as no Representative had been granted them for over thirty years, and Mr. Simpkins was picked out for their candidate. He was nominated and elected by a large majority, and so valuable were his services that he was reëlected in 1896. His familiarity with the harbors and lighthouses on the long stretch of coast surrounding his district enabled him to appear before Committees in Congress, and to present their necessities in an interesting way. He was very successful in having his projects adopted, and when he was to speak on such matters his colleagues listened, for he was talking about what he knew.

Just before his untimely death he was selected by the unanimous vote of his colleagues from Massachusetts to represent them on the National Republican Committee, and this was their tribute to his good judgment.

In Congress he was much respected for his sterling character, his honesty, his genial nature, and his power of persuasion. His intimate friends will never forget his loss.

For the Committee,

CHARLES F. SPRAGUE.

The decease of George W. Campbell, of Delaware, Ohio, a Corresponding Member of the Society, of E. Lewis Sturtevant, M.D., and of David Nevins, was announced, and it was voted that the President appoint Committees to prepare memorials of these members. The President accordingly appointed as a Committee to prepare a memorial of Mr. Campbell, Benjamin G. Smith, Charles F. Curtis, and Robert Manning; to prepare a memorial of Dr. Sturtevant, William C. Strong, J. D. W. French, and Benjamin P. Ware: and to prepare a memorial of Mr. Nevins, N. I. Bowditch, Joseph H. Woodford, and J. Woodward Manning.

The Secretary laid before the Society letters from F. W. Moore, Director of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland, and F. W. Burbidge, Curator of the Botanical Gardens of Trinity College, Dublin, Ireland, acknowledging their election as Corresponding Members of the Society, and returning hearty thanks therefor.

Acknowledgments of the courtesy of the Society in giving the use of its Halls to the Society for the Promotion of Agricultural Science, the Linnæan Fern Chapter, and the American Forestry Association, with thanks therefor, were received from those organizations.

The following vote, moved by Joseph H. Woodford, was unanimously passed:

Voted, That the Treasurer cause to be engraved the names of the persons represented on all the busts in our Hall not now named.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 1, 1898.

A Stated Meeting of the Massachusetts Horticultural Society, being the Annual Meeting for the choice of Officers and Standing Committees, was holden today at eleven o'clock, Vice-President C. H. B. BRECK in the chair.

The Secretary stated that the meeting had been duly notified to the members of the Society agreeably to the Constitution and By-Laws.

William H. Spooner, Chairman of the Nominating Committee, reported that that Committee had nominated J. Woodward Manning as a member of the Committee on Forestry and Roadside Improvement, in place of James H. Bowditch, who was unable to serve. The report was accepted.

The Chair, agreeably to the Constitution and By-Laws, appointed Hon. Aaron Low, C. C. Shaw, and Francis Campbell a Committee to receive, assort, and count the votes given and report the number. The polls were opened at quarter past eleven o'clock.

William C. Strong, Chairman of the Committee appointed at the last meeting to prepare a memorial of Dr. E. Lewis Sturtevant, reported the following, which was unanimously adopted:

Memorial of Edward Lewis Sturtevant.

Edward Lewis Sturtevant, M.D., was born in Boston in 1842, was graduated from Bowdoin College in 1863, and from the Harvard Medical School in due course. He settled in South Framingham, and soon devoted himself to scientific agriculture on a large scale. He also became interested, with his brother, Joseph N. Sturtevant, in the breeding of dairy cattle, and was an earnest advocate of the Ayrshire stock, publishing a monograph entitled "The Dairy Cow." He became a life member of this Society in 1871, and for several years was an active member of the Committee on Publication and Discussion. In 1875 he established a new monthly magazine in Boston, entitled the "Scientific Farmer," which he continued for several years. In the year 1881 he was elected the first Director of the New York Experiment Station, which office he held for six years. In 1887 he was elected President of the national Society for the Promotion of Agricultural Science. In these many and varied fields of labor Dr. Sturtevant showed an active mind, quick to perceive possibilities, and alert to enter upon experiments with minute investigation. That he was successful in the various lines of work which he pursued is attested by the positions of honor to which he was called.

In his death, which occurred on the thirtieth of July last, at South Framingham, the Society mourns the loss of one of its most active, intelligent, and enthusiastic supporters — one who had in former years contributed largely to the interests of its library, its discussions, and its exhibitions. His many services will be held in grateful remembrance. The sympathy of the Society is hereby extended to the family and relatives of the deceased.

Wm. C. Strong, } *Committee.*
Benj'n P. Ware, }

Benjamin G. Smith, Chairman of a Committee appointed at the last meeting to prepare a memorial of George W. Campbell, reported the following, which was unanimously adopted:

Memorial of George W. Campbell.

George Washington Campbell, of Delaware, Ohio, was born in Cherry Valley, N.Y., January 12, 1817, and died July 15, 1898. He was one of the foremost and best known horticulturists of this country, and an amiable, refined, and accomplished gentleman of high scientific attainments. For more than forty years Mr. Campbell had been a devoted student of the science of horticulture, and in practice he had been eminently successful in originating and again in improving, some of the finest and most popular varieties of fruits, especially grapes. Among the best known and most valuable which he introduced and disseminated is the Delaware grape. The Campbell's Early, which was originated by him after years of careful, intelligent painstaking, developed into beautiful perfection, and is now rich in its promise of reward for all his tender care of this last gift to the science he so loved and honored. His extensive glass houses in other years witnessed, too, to the cultured world; here floriculture shared in this intelligent care and love of fruits, in both of which he was looked upon as a standard authority.

Mr. Campbell was elected a Corresponding Member of this Society in 1875. For many years he was President of the Ohio State Horticultural Society. He was also a member of the American Association of Nurserymen, and was appointed by President Hayes United States Commissioner to the Paris World's Fair in 1879. He was a member of the American Pomological Society

from its beginning, and at its last session, at Columbus, Ohio, was elected its First Vice-President. At this session, which occurred only a year ago, he appeared to be full of energy and life, and took as much interest in the proceedings as any of the youngest members. He was ready to give his unbiased opinion to those who sought it, and his death will be a severe loss, not only to his family and many friends, but to American horticultural interests generally.

Mr. Campbell was married August 27, 1846, to Miss Elizabeth Little, the golden wedding of which happy union was quietly celebrated in 1896, and the wife of these fifty years of only golden memories, and three children, miss and mourn a more than usually loving and devoted husband and father. Mr. Campbell was a good citizen, a warm friend, a devoted churchman, and a Christian gentleman. To the members of his family this Society tenders its sincere sympathy in their affliction.

BENJ. G. SMITH,
CHARLES F. CURTIS, } *Committee.*
ROBERT MANNING,

A report was presented from the Executive Committee, unanimously recommending that an additional appropriation of $39 be made for prizes for flowers in 1897, agreeably to the request of the Committee on Flowers. The appropriation was unanimously voted.

The following vote, moved by Henry L. Clapp, was unanimously passed in the affirmative:

Voted, That all exhibitions of native plants, heretofore in charge of the Flower Committee, be transferred to the Special Committee on School Gardens and Children's Herbariums, said Committee to have full power to award prizes and gratuities in such manner as they may consider best for the interests of the Society.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

CHARLES J. SANTHESON, of Reading.
THOMAS ALLEN, of Boston.
EDWIN C. LEWIS, of Taunton.
DAVID FRANK ROY, of Malden.

The polls were closed at a quarter past one.

The Committee to receive, assort, and count the votes, and report the number given, reported the whole number of ballots cast to be fifty, and that the persons named on the ticket presented by the Nominating Committee had a plurality and were elected.

The report was accepted, and the persons named on the above-mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the Chairman to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1899.

Adjourned to Saturday, November 5.

BUSINESS MEETING.

SATURDAY, November 5, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation that the Society make the same appropriations for Prizes and Gratuities for the year 1899 as the present year, viz.:

For Prizes and Gratuities:

For Plants	$2,000
" Flowers	2,668
" Fruits	1,732
" Vegetables	1,200
" Gardens	500
Total for Prizes and Gratuities for the year 1899 .	$8,100

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over for final action until the first Saturday in January next.

The following votes were unanimously passed:

Voted, That this Society extend to the National Farmers' Congress the free use of its Halls and Library, for their meeting of

1899, if they shall honor this State and City by deciding to meet here.

Voted, That the President of this Society be authorized to attend the National Farmers' Congress, at Fort Worth, Texas, December 4–16, 1898, and act as a delegate from this Society.

The Secretary laid before the Society a letter acknowledging, in behalf of the family of the late Dr. E. Lewis Sturtevant, the memorial of him adopted by the Society, and expressing the value in which they held the appreciation of his work by the Society.

The decease of Isidor Bush, of Bushberg, Missouri, a Corresponding Member of the Society, was announced, and it was voted that the President appoint a Committee of three to prepare a memorial of Mr. Bush. The President appointed as that Committee William C. Strong, J. W. Manning, and Samuel Hartwell.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Miss Mabel Congdon, of Cambridge.
Miss Helen F. Ayers, of Medford.
Henry A. Root, of Winthrop Highlands.

Adjourned to Saturday, December 3.

BUSINESS MEETING.

Saturday, December 3, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The Annual Report of the Committee on Flowers was presented by J. Woodward Manning, Chairman, accepted, and referred to the Committee on Publication.

The Annual Report of the Committee on the Library was read by W. E. Endicott, Chairman, accepted, and referred to the Committee on Publication.

J. Woodward Manning, for the Committee on Establishing Prizes, presented the List of Prizes recommended by that Com-

mittee to be offered for the year 1899, and stated the principal changes from that of the present year. The report was accepted and referred to the Committee on Publication, to be printed as the Schedule of Prizes for 1899.

A document establishing the Henry A. Gane Memorial Fund was read and referred to the Finance Committee.

It was voted to extend to the State Board of Agriculture the free use of the Society's Halls and Library for their Annual Meeting in December, 1899, if they shall honor the City by deciding to meet here.

The following named persons were appointed members of the Committee on School Gardens and Children's Herbariums for the year 1899:

Henry L. Clapp, *Chairman.*

George E. Davenport,	Mrs. M. L. Stevens,
Miss Katharine W. Huston,	Charles W. Jenks,
Mrs. P. D. Richards,	William E. C. Rich, *Secretary.*

A letter was read from William A. Taylor, Secretary of the American Pomological Society, asking for the appointment of a delegation to the meeting of that Society (probably at Philadelphia) in September, 1899. It was voted that the Fruit Committee, with such as they may join, constitute that delegation.

The following named persons, having been recommended by the Executive Committee, were on ballot duly elected to member ship in the Society:

Howard Marston, of Boston.
Robert Laurie, of Newport, R.I.
John C. Daly, of Roxbury.
Ernst G. Asmus, of West Hoboken, N.J.

Adjourned to Saturday, December 17.

BUSINESS MEETING.

Saturday, December 17, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock. Neither the President nor either of the Vice-Presidents being present, the meeting was called to order by the

Secretary, and Ex-President William H. Spooner was unanimously elected Chairman *pro tem.*

The Report of the Committee on Plants, the Report of the Committee on Vegetables, the Report of the Committee of Arrangements, and the Report of the Secretary and Librarian were presented. It was

Voted, That these reports be accepted without reading, and referred to the Committee on Publication, provided that that Committee will have them printed within two months.

The Secretary laid before the Society a letter from the Secretary of the State Board of Agriculture, acknowledging the courtesy of the Society in offering the use of its Halls for the public winter meeting of the Board in 1899, and thanking the Society therefor.

Adjourned to Saturday, December 24.

BUSINESS MEETING.

SATURDAY, December 24, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

William C. Strong, Chairman of the Committee appointed at the meeting of the Society on the fifth of November to prepare a memorial of the late Isidor Bush, reported as follows:

MEMORIAL OF ISIDOR BUSH.

The Committee to whom was referred action in regard to the death of Isidor Bush present the following testimonial:

Isidor Bush died on the fifth of August, 1898, in the city of St. Louis, Missouri, of which city he had been a resident for the past forty-nine years. He was born at Prague, Bohemia, in 1822. As a result of participation in the revolution of 1848, he came to America in that year. During our Civil War he was Secretary to General Fremont. In the year 1865 he was a member of the State Convention of Missouri.

Soon after this he established a grape nursery at a locality in Missouri which he named Bushberg, and devoted himself to the

cultivation of this specialty with marked enthusiasm. He soon had a large collection of all the known species and varieties of our native grapes, and with the assistance of the eminent botanist Dr. George Engelmann a very complete classification of the various species was made and their characteristics were very fully described. To this Mr. Bush added a full description of over five hundred varieties of grapes, with careful directions as to propagation and culture. This work was embodied and published in what Mr. Bush modestly called a Catalogue, but since its first appearance it has proved to be of such practical usefulness, as well as of permanent value for its botanical research, that it has reappeared in several editions, has been translated into foreign languages, and is recognized as an authoritative Grape Manual.

It was through the enterprise of Mr. Bush that our immune grape roots were sent to Europe, for the purpose of grafting the vinifera varieties upon them, and thus preventing the ravages of the phylloxera. We knew Mr. Bush personally through his active membership in the American Pomological Society — a wide-awake, alert little man, always so cheery and responsive as to earn from President Wilder the endearing title "My Isidor." The Massachusetts Horticultural Society in 1878 elected Mr. Bush a Corresponding Member, and has received from him copies of his valuable treatises. And now that he has passed on, it places on its record its appreciation of his character, and the permanent value of his services.

It is further

Voted, That the Secretary be requested to send a copy of this action to the family of the deceased.

WILLIAM C. STRONG,
SAMUEL HARTWELL, } *Committee.*
JACOB W. MANNING,

After remarks by Mr. Manning, of the Committee, the testimonial was unanimously adopted.

The President, from the Finance Committee, to which was referred, at the meeting on the third of December, 1898, a document establishing the Henry A. Gane Memorial Fund, reported, recommending that the Society accept the donation.

Voted, That the Society accept the gift of one thousand dollars

from Mrs. Jerome Jones to constitute the Henry A. Gane Memorial Fund; that the Secretary write to Mrs. Jones expressing the thanks of the Society for the gift, and that the Treasurer be, and he hereby is, authorized to sign the receipt for $1,000.

The instrument of donation is as follows:

This instrument witnesseth: That Mrs. Jerome Jones doth hereby give unto the Massachusetts Horticultural Society the sum of One Thousand Dollars to hold in trust for the use or purposes following, and upon conditions set forth, namely:

To pay out of the income of said money, or funds of the said Society, the sum of fifty dollars, to be expended and applied in premiums, as follows:

PRIZES OFFERED FROM THE HENRY A. GANE MEMORIAL FUND.

For the best twelve specimen blooms of any of the seedling chrysanthemums originated by the late Henry A. Gane	$20 00
Second prize	10 00
For the best three specimen plants of any seedling chrysanthemums, not less than three varieties, originated by the late Henry A. Gane	12 00
Second prize	8 00

For the term of three years.

After said three years, Premiums as follows:

PRIZES OFFERED FROM THE HENRY A. GANE MEMORIAL FUND.

For the best twelve specimen blooms of any of the seedling chrysanthemums originated by the late Henry A. Gane	$20 00
For the best three specimen plants of any seedling chrysanthemums, not less than three varieties, originated by the late Henry A. Gane	15 00
For the best new seedling chrysanthemum originated by any other grower	15 00

At the end of ten years a change in the terms of these prizes may be made if agreed to by the donor and the Society.

Prizes not awarded at any time to be cumulative in the Fund.

The Massachusetts Horticultural Society hereby acknowledges the receipt of the above mentioned sum of One Thousand Dollars, the income to be expended as above provided.

(Signed) CHARLES E. RICHARDSON,
Treasurer Massachusetts Horticultural Society.

It was voted that all reports of committees not presented be referred to the Committee on Publication.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1898.

By AZELL C. BOWDITCH, Chairman.

Your Committee would say that the number of exhibitors was not as large the past year as in previous seasons. This is attributed to our being obliged to cut down some of the larger prizes, in order to make room for prizes for new things that are constantly brought to our notice, and at the same time to keep within the appropriation. For instance, the first prize for Groups of Plants, which form quite a feature, at the annual exhibition, is only twenty-five dollars. This will hardly pay a man for the carting, as it takes about fifty plants to make an acceptable group. This season there was but one exhibitor. We mention this as one of the ways in which your Committee are handicapped in their endeavors to interest the public and make the exhibitions creditable to the Society. The weather has been another factor with which we have had to contend. Cold and wet had made it almost impossible for us to give good exhibitions, and the postponing of shows is very disappointing.

January 1. — *Cypripedium bellatulum album* was exhibited for the first time in America, by William Wallace Lunt.

January 8. — Joseph H. White (James Wheeler, gardener) exhibited *Begonia incarnata superba*, which your Committee thought well of and for which they awarded a First Class Certificate of Merit.

January 22. — Cypripedium President McKinley, a new American seedling, parents *C. insigne Chantinii* and *C. Harrisianum su-*

perbum, raised by Hon. C. G. Roebling, of Trenton, N.J., was exhibited. Your Committee awarded it a First Class Certificate of Merit.

January 29. — Mrs. B. P. Cheney was awarded a Silver Medal for *Primula obconica grandiflora*, which your Committee thought well of as a window plant, as it will continue in bloom all the winter months.

March 5. — R. & J. Farquhar & Co. exhibited Narcissus Victoria, a large flower; color, light lemon to deep orange. It was quite an improvement over others of its class, and your Committee deemed it worthy of a First Class Certificate of Merit.

March 19. — W. W. Lunt exhibited Lælio-Cattleya Mrs. John D. Long, a hybrid between *Lælio-Cattleya elegans* var. *Warneri* and *Cattleya superba* var. *splendens*. While partaking of the characteristics of both parents, it was certainly a marked improvement, and is believed to be the first hybrid Lælio-Cattleya of American parentage. It was awarded a Silver Medal.

SPRING EXHIBITION.

March 22, 23, 24, and 25.

This exhibition was most certainly a success. The halls were well filled and most of the prizes were contended for. Among the most prominent exhibitors were John L. Gardner, Dr. C. G. Weld, and W. S. Ewell & Son, and their plants showed marked skill in cultivation and an improvement over plants of former years.

April 30. — Oakes Ames exhibited a very fine plant of Cypripedium Gertrude Hollington, a cross between *C. bellatulum* and *C. ciliolare*, the largest ever shown, having three flowers and three buds. It was awarded the Silver Gilt Medal.

June 11. — W. W. Lunt had a very fine plant of *Cattleya Morgane superbum*, bearing a spike of very pure white flowers. It was awarded a Silver Gilt Medal.

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

W. P. Winsor, of Fairhaven, made a very fine display of Orchids, as did also John L. Gardner. Both were awarded prizes.

July 23. — Robert Laurie, of Newport, R.I., exhibited some pans of a very dwarf variety of Tropæolum, named Vesuvius. Your Committee think that from its very bright color and compact dwarf habit this may be a very useful bedding plant. They awarded it a First Class Certificate of Merit.

August 27. — Oakes Ames placed on the table *Cypripedium insigne* Laura Kimball, a beautiful yellow variety, quite distinct and well worthy a Silver Medal, which was awarded it.

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

September 29 and 30.

George McWilliam exhibited a fine lot of seedling Dipladenias, the most noteworthy of which was a beautiful pink variety named Elsa Whitin, for which was awarded a Silver Medal.

Oakes Ames was also awarded a Silver Medal for the introduction of *Dracæna Godseffiana*. Your Committee consider this novelty well worth growing.

CHRYSANTHEMUM EXHIBITION.

November 8, 9, 10, and 11.

This show had not nearly as many exhibitors as in former years, but what it lacked in quantity it made up in quality. J. S. Bailey had some very fine specimens, as did also Mrs. B. P. Cheney, who was a close second, with a fine lot of very compact and well-flowered plants. William Edgar made a fine display of Begonia Gloire de Lorraine, which your Committee think well of, its dwarf habit and constant flowering making it a most desirable house plant.

November 19. — George McWilliam made a fine display of seedling Dipladenias, one of which, Elizabeth K. Whitin, a beautiful pale pink with a rosy carmine throat, well marked, your Committee thought worthy of a Silver Medal.

Prospective Prize.

The Committee have awarded to James Wheeler the Society's Prospective Prize for the best Seedling Flowering Plant, a seedling white Azalea, $30.

This Azalea has been exhibited for three years. The flower is very large, pure white, of fine shape, and has very firm petals.

Amount appropriated		$2,000 00
Awarded in Premiums and Gratuities .	$1,516 00	
Fifteen Silver Medals	105 00	
Three Silver Gilt Medals	45 00	
Total		1,666 00
Balance unexpended		$334 00

All of which is respectfully submitted,

A. C. Bowditch,
Chairman.

PRIZES AND GRATUITIES AWARDED FOR PLANTS.

1898.

January 1.

Gratuity : —

Henry A. Wheeler, Rose plant $1 00

January 8.

Chinese Primroses. — Six plants, in six-inch pots :

First, Mrs. B. P. Cheney 5 00
Second, Joseph H. White 4 00
Third, Mrs. B. P. Cheney 3 00

Gratuities : —

E. S. Converse, Display of Primroses 3 00
John L. Gardner, *Primula stellata* 3 00
Mrs. B. P. Cheney, " " 2 00

January 15.

Gratuity : —

James E. Rothwell, Display of Orchids 4 00

January 22.

Gratuity : —

Hon. C. G. Roebling, Trenton, N.J., Display of Orchids . . . 3 00

February 12.

Gratuity : —

J. E. Rothwell, *Cypripedium Sallierii*, *C. concolor*, and *C. nitens superbum* 2 00

February 19.

Gratuity : —

John L. Gardner, Six plants of *Primula Sinensis* (double) . . 3 00

February 26.

Gratuity : —

James Comley, *Cypripedium villosum* 3 00

March 12.

Gratuities : —

J. E. Rothwell, Display of Orchids 3 00
Rea Brothers, Rose plant 1 00

March 19.

Gratuity : —

Edward Butler, *Dendrobium nobile* 5 00

SPRING EXHIBITION.

March 22, 23, 24, and 25.

Theodore Lyman Fund.

Indian Azaleas. — Four named varieties:

First, Dr. C. G. Weld	12 00
Second, J. W. Howard	10 00

Two named varieties:

First, Edward Butler	6 00

Specimen plant, named:

First, Edward Butler	10 00
Second, Dr. C. G. Weld	8 00
Third, Dr. C. G. Weld	5 00

Society's Prizes.

Orchids. — Three plants:

Second, John L. Gardner	8 00

Single plant:

First, John L. Gardner	5 00

Stove or Greenhouse Plant. — Specimen in bloom, other than Azalea or Orchid:

First, Dr. C. G. Weld	10 00
Second, Dr. C. G. Weld	8 00

Climbing Rose. — Specimen plant in bloom:

First, C. H. Souther	8 00

Hardy Flowering Deciduous Shrubs, Forced. — Four, of four distinct species, named:

First, Bussey Institution	6 00
Second, Bussey Institution	4 00

Hardy Primroses. — Twelve plants, of distinct varieties:

First, John L. Gardner	8 00

Hardy Polyanthuses. — Twelve plants, of distinct varieties:

First, John L. Gardner	8 00
Second, John L. Gardner	6 00
Third, Dr. C. G. Weld	4 00

Auriculas. — Six, in pots:

First, Dr. C. G. Weld	6 00
Second, Dr. C. G. Weld	4 00

Cyclamens. — Ten plants:

First, J. S. Bailey	15 00
Second, Mrs. B. P. Cheney	12 00

Ten plants, in seven-inch pots:

First, Mrs. B. P. Cheney	8 00
Second, Mrs. B. P. Cheney	6 00
Third, J. S. Bailey	4 00

Single plant:	
First, Mrs. B. P. Cheney	5 00
Second, James Garthley	4 00
Third, J. S. Bailey	3 00
CINERARIAS. — Six varieties:	
First, C. H. Souther	10 00
Second, John L. Gardner	8 00
Third, Dr. C. G. Weld	6 00
Fourth, E. S. Converse	4 00
Three varieties:	
First, James Garthley	6 00
Second, Dr. C. G. Weld	5 00
Third, E. S. Converse	4 00
Single plant:	
First, C. H. Souther	4 00
Second, John L. Gardner	3 00
Third, E. S. Converse	2 00
HYACINTHS. — Twelve named varieties, in pots:	
First, John L. Gardner	6 00
Second, Dr. C. G. Weld	4 00
Third, Bussey Institution	3 00
Six named varieties, in pots, one in each pot:	
First, Bussey Institution	5 00
Second, John L. Gardner	4 00
Third, E. S. Converse	3 00
Single named bulb, in pot:	
First, E. S. Converse	2 00
Second, John L. Gardner	1 00
Three pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, Dr. C. G. Weld	6 00
Second, John L. Gardner	4 00
Third, Bussey Institution	3 00
Two pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, John L. Gardner	4 00
Second, Dr. C. G. Weld	3 00
Third, E. S. Converse	2 00
Single pan, not to exceed twelve inches, with ten bulbs of one variety:	
First, Bussey Institution	3 00
Second, Bussey Institution	2 00
Third, E. S. Converse	1 00
TULIPS. — Six eight-inch pans, nine bulbs of one variety in each:	
First, Dr. C. G. Weld	4 00
Second, Bussey Institution	3 00
Third, W. S. Ewell & Son	2 00

Three eight-inch pans, nine bulbs of one variety in each:

First, E. S. Converse	3 00
Second, W. S. Ewell & Son	2 00
Third, Bussey Institution	1 00

Three ten-inch pans, twelve bulbs of one variety in each:

First, Dr. C. G. Weld	5 00
Second, Bussey Institution	4 00
Third, Dr. C. G. Weld	3 00

Polyanthus Narcissus. — Four seven-inch pots, four bulbs in each, distinct varieties:

First, John L. Gardner	4 00
Second, Bussey Institution	3 00

Jonquils. — Six pots or pans, not exceeding eight inches, the number of bulbs in each to be at the discretion of the grower:

First, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00
Third, John L. Gardner	2 00

Narcissuses. — Six eight-inch pans, distinct varieties, single or double:

First, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00

Three eight-inch pans:

First, W. S. Ewell & Son	3 00
Second, Bussey Institution	2 00

Lilium Harrisii. — Six pots, not exceeding ten inches:

First, J. W. Howard	10 00
Second, J. W. Howard	8 00

Lily of the Valley. — Six pots or pans, not exceeding ten inches:

First, Bussey Institution	4 00

Crocuses. — Three ten-inch pans, distinct varieties:

First, W. S. Ewell & Son	3 00

Anemones. — Three pots or pans:

First, Bussey Institution	4 00
Second, Bussey Institution	3 00

Freesias. — Six pots or pans:

First, Dr. C. G. Weld	3 00

Ixias. — Six pots or pans, in varieties:

First, Dr. C. G. Weld	4 00

Tritonias. — Six pots or pans, in varieties:

First, Dr. C. G. Weld	3 00

Roman Hyacinths. — Six eight-inch pans, ten bulbs in a pan:

First, Dr. C. G. Weld	3 00
Second, W. S. Ewell & Son	2 00
Third, Bussey Institution	1 00

General Display of Spring Bulbs. — All classes:

First, W. S. Ewell & Son	15 00
Second, Bussey Institution	12 00

Gratuities : —

Bayard Thayer (James Brydon, gardener), *Cattleya Schröderæ* . 4 00
Harvard Botanic Garden (Robert Cameron, gardener), *Dendrobium Fytchianum* 3 00
Joseph Tailby & Son, Climbing Rose 2 00
Bussey Institution, Grape Hyacinths 1 00
R. & J. Farquhar & Co., Lily of the Valley 2 00
William A. Bock, Display 8 00
Mrs. B. P. Cheney " 5 00
John L. Gardner " 5 00
James Garthley " 3 00
Dr. C. G. Weld " 2 00

April 2.

Gratuity : —

Mrs. A. W. Blake, *Iberis perennis* and *Hydrangea Otaksa* . . 2 00

April 9.

Gratuity :—

J. E. Rothwell, *Oncidium ampliatum* 3 00

April 16.

Gratuities : —

Henry A. Wheeler, Crimson Rambler Rose 1 00
J. W. Howard, *Amaryllis vittata hybrida*, seedling 1 00

April 23.

Gratuities : —

James Comley, *Cytisus albus* 2 00
Mrs. D. M. Folger, Gloxinia 1 00
C. E. Richardson, Seedling Amaryllis 1 00

April 30.

Gratuity : —

Edward J. Mitton, *Chorizema Lowii* 3 00

MAY EXHIBITION.

May 7.

Pelargoniums. — Six named Show or Fancy varieties, in not less than eight-inch pots, in bloom :
First, N. T. Kidder 10 00
Six pots or pans of Ivy-Leaved, in bloom :
First, John Jeffries 6 00

INDIAN AZALEAS. — Six plants, in pots, named:	
First, Dr. C. G. Weld	8 00
Single specimen:	
First, Dr. C. G. Weld	3 00
Second, Dr. C. G. Weld	2 00
CALCEOLARIAS. — Six varieties, in pots:	
First, Mrs. B. P. Cheney	10 00
Second, Dr. C. G. Weld	8 00
Third, Mrs. B. P. Cheney	6 00
Fourth, J. S. Bailey	4 00
Single specimen:	
First, J. S. Bailey	3 00
Second, Mrs. B. P. Cheney	2 00
Third, E. S. Converse	1 00
ORCHIDS. — Display, named:	
First, J. E. Rothwell	12 00
Gratuities: —	
Edward J. Mitton, Display	2 00
Mrs. A. W. Blake, "	2 00

MAY 21.

Gratuities: —	
Mrs. A. W. Blake, Display of *Azalea Indica*	3 00
J. E. Rothwell, *Oncidium Marshallianum*	1 00

RHODODENDRON SHOW.

JUNE 7 AND 8 (*postponed from* JUNE 2 AND 3).

ORCHIDS. — Display arranged for effect, with foliage plants:	
First, John L. Gardner	30 00
Gratuities: —	
Kenneth Finlayson, *Cypripedium Lawrenceanum*, four pots	6 00
J. S. Bailey, *Cattleya Gaskelliana*	3 00
Kenneth Finlayson, Pelargoniums, six pots	5 00
Mrs. A. W. Blake, Display of Azaleas	3 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

GLOXINIAS. — Six plants in not less than eight-inch pots:	
First, James L. Little	8 00
ORCHIDS. — Six plants, of six named varieties, in bloom:	
First, W. P. Winsor	15 00
Second, W. P. Winsor	10 00

Three plants, of three named varieties, in bloom:
First, W. P. Winsor 10 00
Second, John L. Gardner 8 00
Single specimen, named:
First, W. P. Winsor, *Cœlogyne Dayana* 5 00
Second, W. P. Winsor, *Cypripedium grande atratum* . . 3 00

Gratuities: —
E. J. Mitton, Display of Pelargoniums 8 00
Walter Hunnewell, Hydrangeas 1 00

JULY 23.

Gratuity: —
Mrs. A. W. Blake, *Cattleya gigas* 1 00

JULY 30.

Gratuity: —
J. E. Rothwell, New American Cypripedium, *Lawrenceanum* × *Marshallianum* 2 00

AUGUST 6.

Gratuity: —
J. E. Rothwell, Cypripedium A. de Lairesse 5 00

AUGUST 13.

Gratuity: —
H. A. Wheeler, *Torenia Fournieri* 2 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

AUGUST 20.

OUVIRANDRA FENESTRALIS. —
First, E. S. Converse 8 00
Second, John L. Gardner 6 00

Gratuities: —
E. A. & W. K. Wood, *Stanhopea tigrina* 2 00
John L. Gardner, *Cypripedium Morganiæ* 1 00
E. J. Mitton, *Dieffenbachia Bausei* and *Cyanophyllum magnificum* . 2 00
W. H. Lincoln, *Adiantum concinnum* 2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

H. H. Hunnewell Fund.

HARDY CONIFEROUS TREES. — Display in pots and tubs, named:
First, Francis Blake 25 00

Society's Prizes.

PALMS. — Pair, in pots or tubs not more than twenty-four inches in diameter:

First, Dr. C. G. Weld	12 00

GREENHOUSE PLANTS. — Collection, containing foliage plants of all descriptions, not to exceed forty plants, in pots or tubs:

First, J. S. Bailey	40 00
Second, John L. Gardner	30 00

Six Greenhouse and Stove plants, of different named varieties, two Crotons admissible:

First, N. T. Kidder	25 00
Second, Dr. C. G. Weld	20 00
Third, John L. Gardner	15 00

TABLE DECORATION. — For fifteen covers, living plants, in one receptacle, only one entry admissible:

First, Mrs. E. M. Gill	10 00
Second, H. A. Wheeler	8 00
Third, E. S. Converse	6 00
Fourth, W. S. Lincoln	4 00

SPECIMEN FLOWERING GREENHOUSE PLANT. — Single named variety:

First, N. T. Kidder	8 00

CALADIUMS. — Six named varieties:

First, N. T. Kidder	8 00
Second, Dr. C. G. Weld	6 00

FERNS. — Six named varieties, no Adiantums admissible:

First, Dr. C. G. Weld	10 00

Specimen, other than Tree Fern:

First, H. H. Hunnewell	4 00
Second, N. T. Kidder	3 00

ADIANTUMS. — Five named varieties:

First, Dr. C. G. Weld	8 00

LYCOPODS. — Four named varieties:

First, Dr. C. G. Weld	5 00

DRACÆNAS. — Six named varieties:

First, Dr. C. G. Weld	8 00

CROTONS. — Six named varieties, in not less than eight-inch pots:

First, Dr. C. G. Weld	10 00

CYCAD. — Single plant, named:

First, H. H. Hunnewell	10 00
Second, James L. Little	8 00
Third, J. W. Howard	6 00

ORCHIDS. — Six plants, named varieties, in bloom:

First, J. E. Rothwell	15 00

Three plants, named varieties, in bloom:

Second, H. A. Wheeler	8 00

Single plant, in bloom:

First, J. E. Rothwell	5 00
Second, H. A. Wheeler	4 00

BEGONIA REX. — Six pots, of six varieties:
First, E. S. Converse 8 00
Second, E. J. Mitton 6 00
BEGONIAS, REX HYBRIDS. — Collection, named:
First, E. S. Converse 8 00
Second, E. J. Mitton 6 00
CANNAS. — Collection of not less than ten named varieties, grown in pots or tubs:
Second, C. H. Souther 8 00

Gratuities: —
Yamanaka & Co., Collection of Japanese plants 20 00
J. S. Bailey, *Adiantum Farleyense* 10 00
E. S. Converse, *Fittonia argyroneura* 2 00
J. W. Howard, Collection of Ferns 5 00
J. E. Rothwell, Thirty named Crotons 8 00
Charles H. Souther, Anthuriums 5 00
J. L. Little, Begonias 5 00
N. T. Kidder, Collection 10 00

SEPTEMBER 10.

Gratuity: —
Oakes Ames, *Cypripedium Gravesiæ* 1 00

SEPTEMBER 24.

Gratuity: —
James Comley, Rhododendron Maiden's Blush 2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

Gratuity: —
E. S. Converse, Display of Plants 25 00

OCTOBER 8.

Gratuities: —
J. E. Rothwell, *Oncidium varicosum* and *Cattleya aurea* var. *Rothwelliana* 3 00
E. J. Mitton, Two plants *Cattleya labiata* 3 00

OCTOBER 22.

Gratuity: —
J. E. Rothwell, *Cattleya labiata* 2 00

OCTOBER 29.

Gratuities: —
J. E. Rothwell, *Cypripedium Arthurianum pulchellum* . 2 00
J. E. Rothwell, *Vanda cærulea* 2 00

CHRYSANTHEMUM EXHIBITION.

NOVEMBER 8, 9, 10, AND 11.

CHRYSANTHEMUMS. — Display of twelve named plants, any or all classes, distinct varieties:

First, J. S. Bailey	50 00
Second, Mrs. B. P. Cheney	40 00
Fourth, E. S. Converse	20 00

Three Japanese Incurved:

First, Mrs. B. P. Cheney	10 00
Second, J. S. Bailey	7 00
Third, Mrs. B. P. Cheney	5 00

Three Reflexed, distinct named varieties:

First, Mrs. B. P. Cheney	10 00
Second, J. S. Bailey	7 00
Third, Mrs. B. P. Cheney	5 00

Specimen Incurved, named variety:

First, James Garthley	6 00
Second, J. S. Bailey	5 00
Third, J. S. Bailey	4 00

Specimen Reflexed, named variety:

First, Mrs. B. P. Cheney	6 00
Second, J. S. Bailey	5 00

Specimen Anemone Flowered, named variety:

First, J. S. Bailey	6 00
Second, Mrs. B. P. Cheney	5 00
Third, Mrs. B. P. Cheney	4 00

Specimen Pompon, named variety:

First, Mrs. B. P. Cheney	4 00
Second, Mrs. B. P. Cheney	3 00

Twelve plants, of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height:

First, Mrs. A. W. Blake	10 00
Second, Mrs. A. W. Blake	8 00
Third, Dr. C. G. Weld	6 00
Fourth, C. H. Souther	4 00

Six plants grown as above, but all of one color, Red:

First, J. L. Little	5 00
Second, Dr. C. G. Weld	4 00
Third, E. S. Converse	3 00

White:

First, Dr. C. G. Weld	5 00
Second, C. H. Souther	4 00
Third, J. L. Little	3 00

Pink:
First, Dr. C. G. Weld 5 00
Second, Dr. C. G. Weld 4 00
Third, J. L. Little 3 00
Yellow:
First, Dr. C. G. Weld 5 00
Second, J. L. Little 4 00
Third, James Nicol 3 00
Any other color:
First, Mrs. A. W. Blake 5 00
Second, Dr. C. G. Weld 4 00
Third, Mrs. A. W. Blake 3 00
Group of Chrysanthemums, without stakes, arranged for effect, limited to one hundred square feet, and edged with ferns or low growing decorative plants:
First, Mrs. A. W. Blake 25 00

Gratuities: —
William Edgar, Begonia Gloire de Lorraine 20 00
James Garthley, Chrysanthemum Le Colosse Grenoblois . . . 3 00

NOVEMBER 19.

Gratuity: —
H. A. Wheeler, *Zygopetalum Mackayi* and *Cypripedium insigne* . 2 00

NOVEMBER 26.

Gratuity: —
J. E. Rothwell, Five plants Begonia Gloire de Lorraine . . . 5 00

DECEMBER 3.

Gratuity: —
H. A. Wheeler, Two Orchids 2 00

SILVER GILT MEDALS.

April 30. Oakes Ames, for Cypripedium Gertrude Hollington.
June 11. W. W. Lunt, for *Cattleya Morganiæ superba.*
Annual Exhibition of Fruits and Vegetables, September 29 and 30. Oakes Ames, for *Dracæna Godseffiana.*

SOCIETY'S SILVER MEDALS.

January 1. W. W. Lunt, for *Cypripedium bellatulum album.*
" 8. J. E. Rothwell, for *Odontoglossum Vuylstekeanum.*
" 29. Mrs. B. P. Cheney, for *Primula obconica grandiflora.*
March 19. W. W. Lunt, for Lælio-Cattleya Mrs. John D. Long.
April 16. J. E. Rothwell, for *Cypripedium niveum* var. *grandiflorum.*
May 14. J. E. Rothwell, for *Cypripedium bellatulum album.*
August 27. Oakes Ames, for *Cypripedium insigne* Laura Kimball.
Annual Exhibition of Plants and Flowers, August 31 and September 1.
H. H. Hunnewell, for *Asparagus Sprengeri.*
Yamanaka & Co., *Chamæcyparis obtusa nana.*

September 24. Oakes Ames, for Introduction of *Acalypha hispida*.
Annual Exhibition of Fruits and Vegetables, September 29 and 30.
J. E. Rothwell, for *Cypripedium insigne* var. *Sanderæ*.
Oakes Ames, for Seedling Cattleya.
George McWilliam, for New Seedling Dipladenia Elsa Whitin.
November 19. George McWilliam, for Three Seedling Cypripediums.
December 3. George McWilliam, for Five Seedling Dipladenias, including Dipladenia Elsa Whitin.

FIRST CLASS CERTIFICATES OF MERIT.

January 8. Joseph H. White, for *Begonia incarnata superba*.
" 22. Hon. C. G. Roebling, Trenton, N.J., for Cypripedium President McKinley.
" 29. Oakes Ames, for *Cattleya Trianæ* vars. *Amesiana* and *unicolor*.
February 19. W. W. Lunt, for *Cypripedium Lathamianum*.
" " James Comley, for Double Hybrid Prunus, from Japan.
March 5. R. & J. Farquhar & Co., for Narcissus Victoria.
April 16. J. E. Rothwell, for Cypripedium T. W. Bond.
" 30. W. W. Lunt, for *Oncidium Kramerianum*.
May Exhibition, May 7. J. E. Rothwell, for Phalænopsis Harrietta.
May 21. J. S. Bailey, for *Miltonia vexillaria Hilliana*.
June 18. Oakes Ames, for *Cattleya Mendelii* Mrs. A. C. Ames.
Rose and Strawberry Exhibition, June 23 and 24. J. B. Shurtleff, for new variety silver-leaved Pelargonium.
July 23. Robert Laurie, for Tropæolum Vesuvius.
August 6. Edward G. Uihlin, Chicago, Ill., for Display of Orchids.
Annual Exhibition of Fruits and Vegetables, September 29 and 30. Oakes Ames, for *Acalypha Godseffiana*.
October 22. Oakes Ames, for *Catasetum arachnoides*.
December 3. J. E. Rothwell, *Cypripedium insigne* var. *Schröderianum*.

HONORABLE MENTION.

January 22. Oakes Ames, for *Dendrobium Wardianum*.
April 23. J. E. Rothwell, for *Cypripedium leuchochilum*.
Rhododendron Show, June 7 and 8 (postponed from June 2 and 3). Walter Hunnewell, for Seedling Fuchsia Walter Hunnewell.
Rose and Strawberry Exhibition, June 23 and 24. W. E. Coburn, for Pelargonium Glendale.
September 24. Oakes Ames, for *Cypripedium Aspasia*.
October 29. R. & J. Farquhar & Co., for new Japanese Anemone.

AZELL C. BOWDITCH,
JAMES COMLEY,
JAMES WHEELER,
WILLIAM J. MARTIN,
ARTHUR H. FEWKES,
Committee on Plants.

REPORT

OF THE

COMMITTEE ON FLOWERS,

FOR THE YEAR 1898.

By J. WOODWARD MANNING, Chairman.

Your Committee would report on the work of the year as follows:

The total amount of prizes awarded is a fair criterion of the year's exhibitions, which, on the whole, have not been as numerous nor the prizes as closely contested for as in other years. While the effect, from exhibition to exhibition, has seemed much the same as in years past, yet a careful survey of the results shows considerable falling off from previous years. This may be due largely to abnormal weather conditions, which have, to a certain extent, interfered with the successful growth of the flowers and with their coming to perfection in season to admit of their being staged at the time indicated by the schedule. The quality of the flowers shown compares very favorably indeed with past years, and those exhibitors who for many years past have been constant contributors seem to show as lively an interest as in the past, and the increasing excellence of their exhibits is noticeable.

To review the year's work somewhat in detail, we would state that a very excellent exhibition of Chinese Primroses, shown in flat dishes, was made January 8, and the display was particularly noticeable for the unusual variety of color, individual size, and variations in form shown by the various flowers. Joseph H. White carried off the first prize and Walter E. Coburn the second.

January 15 Oakes Ames showed an unusually fine variety of *Cattleya Triange* under the name of Lilian Chatman, for which a Silver Medal was awarded, and Hon. C. G. Roebling, of Trenton, N.J., was awarded a Silver Medal for a particularly unique form of *Cattleya Triana* under the varietal name of Clinkaberryana.

February 5 a unique display of Orchids was made by Oakes Ames, for which the first prize was awarded. Violets were shown in perfection by David Nevins and William C. Winter.

February 12 William Wallace Lunt was awarded a First Class Certificate of Merit for the new Cypripedium bearing his name.

March 12 R. & J. Farquhar & Co. showed a new Narcissus, var. Victoria; a very desirable, large-flowered kind, of which Honorable Mention was made. On this date Hon. C. G. Roebling was awarded a Silver Medal for *Cypripedium Rothschildianum*, Trenton variety.

SPRING EXHIBITION.

March 22 and 23.

The Spring Exhibition brought very close competition in forced Roses and Carnations. Particularly fine vases of Bridesmaid and The Bride Roses were shown, the prizes being competed for by William H. Elliott and Robert McGorum. Carnations and Violets were never shown to better advantage, and the prizes were closely competed for.

RHODODENDRON SHOW.

June 7 and 8 (postponed from June 2 and 3).

The Rhododendron Exhibition, owing to the coolness of the season, was postponed from June 2 and 3 to June 7 and 8, at which time a very creditable exhibition was made, although the competition was not as sharp as has been the case in former years. H. H. Hunnewell made a most remarkable exhibit of a great many varieties, occupying an entire table. Other principal exhibitors were James Comley and Dr. C. G. Weld. At this show a particularly fine display of Hybrid Aquilegias was made by Frederick S. Davis.

PÆONY SHOW.

June 18 (postponed from June 11).

The Pæony Exhibition was, of necessity, postponed from June 11 until June 18, at which time a most remarkable display was

made in the classes called for. Competition was very sharp, and altogether this proved one of the most interesting exhibitions of the year. Dr. C. G. Weld, T. C. Thurlow, and George Hollis were the principal competitors. R. & J. Farquhar & Co. made a particularly effective display of Hybrid Pyrethrums, for which a Silver Medal was granted. *Philadelphus Lemoinei*, a new hardy shrub exhibited by T. C. Thurlow, was awarded a First Class Certificate of Merit.

ROSE EXHIBITION.

June 23 and 24.

The Rose Exhibition of June 23 and 24, owing to weather conditions, proved quite disappointing. Many exhibitors, who under ordinary conditions would have competed closely, were unable to make entries. The peculiar conditions of weather that prevailed made it impossible for the Committee to judge as to the postponement of the exhibit to a later date, and it is doubtful whether any postponement would have improved matters, as cool weather and abundant rains, preceded by a very sharp hot spell, made conditions anything but favorable for the production of first-class roses. At this exhibition Robert Laurie, of Newport, R.I., exhibited a vase of Chrysanthemum Independence, which attracted attention, particularly on account of its abnormal season of bloom. He also made a display of Fringed Begonias, which combined a great range of color with form and size of bloom.

July 2 W. W. Lunt was awarded a First Class Certificate of Merit for a beautiful form of *Dendrobium thyrsiflorum* under the varietal name of *Hinghamense*. Hon. C. G. Roebling was also awarded a First Class Certificate of Merit for *Lælio-Cattleya Canhamiana alba*.

Hollyhocks were not in condition to show on July 7, and subsequent exhibitions of these flowers were not up to the usual standard.

Tuberous Begonias were shown to very good advantage on July 16, and competition was close between E. S. Converse and James L. Little.

The exhibition of Sweet Peas on July 23 was well staged and showed great improvement in variety over years past. The

flowers were in good condition, the competition was close, and altogether the general effect was all that could be desired.

Perennial Phloxes in the exhibition of July 30 were well shown and a continued improvement was noted in this class.

August 6 Rea Brothers made a particularly creditable show of *Veronica longifolia* var. *subsessilis*, which proves to be one of our hardiest perennials, combining sturdy habit of growth with prolific bloom of a particularly rich shade of blue. Gladioli were principally shown by J. Warren Clark, in well-grown spikes displayed to the best advantage.

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

August 20.

The Aquatic Exhibition on August 20 was confined mainly to a display made by Henry A. Dreer, of Philadelphia, who took the first prize in both entries. James Comley displayed a new Hybrid Magnolia, a cross between *Magnolia grandiflora* and *M. Soulangeana* (?), resulting in a form with evergreen foliage and a very large, intensely fragrant ivory-white flower. For this was awarded a Silver Medal. Henry A. Dreer was awarded a First Class Certificate of Merit for Cannas and Petunias; and the same for *Nymphæa Gladstoniana*.

August 27 J. Warren Clark was awarded Honorable Mention for a particularly effective yellow variety of Gladiolus, named Yellow Bird, and on this date he also made a creditable exhibition of other Gladioli.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

August 31 and September 1.

The exhibition of Dahlias at the Annual Show proved one of the most interesting of the year. Competition was very close, all classes being entered, and the merit of the individual flowers was all that could be desired. The exhibition attracted a great deal of attention and proved the Dahlia to be rising in popularity.

September 1 Jackson Dawson was awarded Honorable Mention for *Polygonum compactum*, a particularly desirable species, worthy of attention by cultivators in general.

September 10 Henry A. Dreer, of Philadelphia, was granted Honorable Mention for *Nymphæa Heusteriana*, a very promising new form.

September 17 George McWilliam was awarded Honorable Mention for a new seedling Dipladenia, Elsa Whitin. At the same time, and also on September 24 and October 1, Lothrop & Higgins made displays of Dahlias in various classes which were particularly well staged, showing a remarkable collection of varieties, and indicating the peculiar character and value of this class.

October 15 Hon. C. G. Roebling, of Trenton, N.J., was granted a Silver Medal for a unique and beautiful Orchid, *Dendrobium Phalænopsis* var. *Hololeuca;* also a First Class Certificate of Merit for *Cattleya labiata* var. *alba.*

October 29 Jackson Dawson was awarded a Silver Medal for *Euonymus Bungeanus*, which proves to be a most remarkable small, hardy tree, — the most remarkable that has been brought to the Hall for several years past. It is perfectly hardy, forming a large bush or small tree with slender branches which are quite enveloped with innumerable orange-red fruits with pink pericarps. Mr. Dawson also received the award of a First Class Certificate of Merit for *Ribes fasciculatum* var. *Chinensis*, a low bush with an abundance of the brightest cardinal-colored fruits.

R. & J. Farquhar & Co. exhibited a new double pink variety of *Anemone Japonica*, for which Honorable Mention was awarded.

CHRYSANTHEMUM EXHIBITION.

November 8, 9, 10, and 11.

While it would seem that in the last few years Chrysanthemum culture had reached its highest excellence, the present year proved that improvements have been made over the past. The specimen flowers were the finest that have ever been seen in our Hall, and altogether the Exhibition was a very marked success. It is very true that there was less competition in some of the classes than in past years, yet the entry into the field of new competitors shows that interest is not lacking and that future years will not fail to call forth close competition. The exhibitors were placed to some disadvantage by the early opening of the Hall, and it has been suggested that the opening hour of the first

day be set forward in order to give the exhibitors more time. The vases, in consequence of lack of time, were not as effective the first day as has been the case in other years. This matter was remedied later during the exhibition. The perfection to which specimen blooms have been brought, by careful cultivation, is marvellous, yet it seems that the principal exhibitors are still looking forward to additional laurels and great improvements in future years. These efforts on the part of our successful competitors will be watched with interest by your Committee, as well as by the public in general. At this exhibition Ernst G. Asmus, of West Hoboken, N.J., showed a large vase of the new Rose, Liberty, which created a great deal of enthusiasm, and seems particularly promising from its perfect shape, its intense color, and rich fragrance. Altogether, the indications are that this rose will prove exceedingly popular when introduced to the market.

November 19 Mr. George McWilliam exhibited a collection of seedling Dipladenias showing a great range of color in this valuable greenhouse plant, which would seem very promising for future use. A Silver Medal was given for the collection.

Native Plants.

Native plants were shown in unusual abundance by a number of competitors during the spring, summer, and autumn. Competition was very close — so close that at many times your Committee had to weigh their decisions with great care. A marked improvement is visible in the staging of the exhibits and the merits of the individual vases, as well as in the arrangement of the displays. Many rare plants were shown that were interesting from a botanical standpoint, and the best of the showy natives were not overlooked in any way. Competition has been more close in this particular class than in any other, and while the judgment of the Committee has been taken to task quite seriously by some of the exhibitors, absolute honesty in judgment has been the effort of your Committee.

Hardy Herbaceous Perennials.

These have not been shown to the same extent as in past years. It would seem particularly unfortunate that this has been the

case. The class is worthy of the greatest attention, as it includes some of the most effective plants of the garden. Their perennial character makes them especially desirable, while their effectiveness will bear comparison with any other class. Though the interest seems to have lessened from a competitive standpoint, yet we believe that this will be temporary and that other years will see a revival of active competition amongst exhibitors.

The amount appropriated for the year 1898 was .	$2,668 00
Awards of Prizes and Gratuities have been made to the amount of	2,065 00
Leaving an unexpended balance of	$603 00

Out of which medals, etc., are to be paid for.

All of which is respectfully submitted by your Committee.

J. Woodward Manning, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1898.

January 8.

Chinese Primroses. — Display of fifty or more individual blooms:

First, Joseph H. White	$2 00
Second, W. E. Coburn	1 00

Freesias. — Vase of fifty spikes:

First, W. N. Craig	2 00
Second, Mrs. E. M. Gill	1 00

January 15.

Gratuities: —

Oakes Ames, collection of *Cattleya Trianæ*	4 00
James Comley, Display of Flowers	3 00

January 22.

Gratuity: —

James L. Little, *Bignonia diversifolia*	1 00

January 29.

Gratuity: —

James Comley, Display of Flowers	2 00

February 5.

Orchids. — Display of named species and varieties, filling not less than twenty bottles:

First, Oakes Ames	15 00

Violets. — Best collection of varieties, fifty blooms of each in a bunch:

First, David Nevins	4 00
Third, William C. Winter	2 00

Carnations. — Display of cut blooms, with foliage, not less than six varieties, in vases:

First, William Nicholson	8 00
Second, M. A. Patten	6 00

Camellias. — Display of named varieties, cut flowers with foliage, not less than twelve blooms of not less than six varieties:

First, James Comley	4 00
Second, James Comley	3 00

Gratuities: —

James Comley, two pans of *Cœlogyne cristata*	2 00
E. A. & W. K. Wood, Display of Carnations	1 00
Mrs. E. M. Gill, Display of Flowers	2 00
C. E. Richardson, " " "	1 00

February 12.

Gratuity : —

James Comley, Display of Flowers 2 00

February 19.

Gratuities : —

James Comley, Display of Flowers 2 00
Mrs. E. M. Gill, " " " 1 00

February 26.

Gratuity : —

James Comley, Display of Flowers 1 00

March 5.

Gratuity : —

Mrs. E. M. Gill, Display of Flowers 1 00

March 12.

Gratuities : —

James Comley, Display of Flowers 5 00
Mrs. P. D. Richards, Native Plants 1 00

March 19.

Gratuities : —

Edward Butler, Display of Orchids 1 00
Mrs. P. D. Richards, Native Plants 1 00

SPRING EXHIBITION.

March 22, 23, 24, and 25.

Hybrid Perpetual Roses. — Twelve blooms, of not less than four named varieties :

First, C. H. Souther 12 00
Second, David Nevins 10 00

Six blooms, not less than three named varieties :

First, David Nevins 6 00
Second, C. H. Souther 5 00

Twelve blooms of Ulrich Brunner :

First, David Nevins 10 00

Tender Roses in Vases. — Twenty-five blooms of Bridesmaid :

First, William H. Elliott 12 00
Second, Robert McGorum 10 00

Twenty-five blooms of The Bride :

First, William H. Elliott 12 00
Second, Robert McGorum 10 00

CARNATIONS. — Vase of one hundred cut blooms, with foliage, not less than six varieties:

First, M. A. Patten	8 00

Twenty-five blooms of any named Crimson variety:

First, E. A. & W. K. Wood, for Ferdinand Mangold	3 00

Twenty-five blooms of any named Dark Pink variety:

First, M. A. Patten, for William Scott	3 00
Second, E. A. & W. K. Wood, for William Scott	2 00

Twenty-five blooms of any named Light Pink variety:

First, William Nicholson, for Daybreak	3 00
Second, E. A. & W. K. Wood, for Daybreak	2 00

Twenty-five blooms of any named Scarlet variety:

First, F. A. Blake, for Bon Ton	3 00
Second, J. Tailby & Sons, for Wellesley	2 00

Twenty-five blooms of any named White variety:

First, E. A. & W. K. Wood, for Uncle John	3 00
Second, M. A. Patten, for Edith Foster	2 00

Twenty-five blooms of any White Variegated variety:

First, M. A. Patten, for Mrs. G. M. Bradt	4 00

PANSIES. — Forty-eight cut blooms, not less than twenty-four varieties, in flat dishes:

First, Estate of Joseph S. Fay	3 00
Second, C. H. Souther	2 00

VIOLETS. — Bunch of one hundred blooms of California:

First, David Nevins	3 00
Second, Harry S. Rand	2 00

Bunch of one hundred blooms of Lady Hume Campbell:

First, David Nevins	3 00

Bunch of one hundred blooms of Marie Louise:

First, David Nevins	3 00
Second, Harry S. Rand	2 00

Bunch of one hundred blooms of any other double variety:

First, David Nevins, for Farquhar	3 00
Second, David Nevins, for Swanley White	2 00

ANTIRRHINUMS. — Display, not less than three varieties:

First, Mrs. John Jeffries	3 00
Second, Charles H. Souther	2 00

Gratuities: —

David Nevins, Display of Roses	10 00
Estate of Joseph S. Fay, Display of Pansies	1 00
F. W. Fletcher, Display of Violets	1 00
James Comley, Display of Flowers	10 00
James Garthley, " " "	3 00
Mrs. E. M. Gill, " " "	2 00

April 2.

Gratuities : —

James Comley, Display of Flowers 2 00
Mrs. P. D. Richards, Native Plants 1 00

April 9.

Gratuity : —

Mrs. P. D. Richards, Native Plants 1 00

April 16.

Gratuity : —

Mrs. E. M. Gill, Display of Flowers 1 00

April 23.

Gratuities : —

James Comley, Display of Flowers 2 00
Mrs. P. D. Richards, Display of Native Plants 1 00

April 30.

Gratuity : —

Edward J. Mitton, Gloxinias 2 00

MAY EXHIBITION.

May 7.

Tulips. — Forty-eight blooms, not less than twelve named varieties :
First, W. N. Craig 4 00
Second, Henry A. Wheeler 2 00
Hardy Narcissuses. — Collection of fifty vases of not less than ten named varieties :
First, Dr. C. G. Weld 8 00
Second, W. N. Craig 6 00
Pansies. — Forty-eight blooms, not less than twenty-four varieties, in flat dishes
First, Estate of Joseph S. Fay 4 00
Second, Estate of Joseph S. Fay 3 00
Third, Estate of Joseph S. Fay 2 00
Native Plants. — Collection of thirty bottles of named species and varieties, one bottle of each :
First, Mrs. P. D. Richards 8 00
Second, Misses Eleanor A. and Mollie S. Doran . . . 6 00
Third, Miss Genevieve Doran 4 00

Gratuities : —

William S. Eager, Display of Carnation Nivea 2 00
J. S. Bailey, Display of Carnation Daybreak 1 00
W. N. Craig, Display of Carnations and Pelargoniums . . . 1 00

Estate of Joseph S. Fay, Display of Pansies 2 00
John Jeffries, Display of Antirrhinums 1 00
Rea Brothers, Display of *Primula acaulis hybrida* 1 00
James Comley, Display of Flowers 3 00
Dr. C. G. Weld, " " " 3 00
Mrs. E. M. Gill, " " " 2 00
Miss Vivien May Norris, Native Plants 1 00
Joseph Anderson, " " 1 00

MAY 14.

Gratuities: —
Estate of Joseph S. Fay, Display of Pansies 5 00
James Comley, Display of Flowers 4 00
Mrs. E. M. Gill, " " " 2 00
Mrs. P. D. Richards, Native Plants 3 00
R. M. Puroes, " " 1 00

MAY 21.

HARDY PRIMULAS. — Display:
Second, Oakes Ames 2 00

Gratuities: —
J. S. Bailey, Display of Orchids 3 00
C. H. Souther, Gloxinias 2 00
James Comley, Display of Flowers 5 00
Mrs. E. M. Gill, " " " 2 00
Rea Brothers, " " " 2 00
H. A. Wheeler, " " " 1 00
Mrs. P. D. Richards, Native Plants 2 00

MAY 28.

Gratuities: —
Miss Vivien May Norris, Native Plants 2 00
Mrs. P. D. Richards, " " 2 00

JUNE 4.

Gratuity: —
H. H. Hunnewell, Display of Rhododendrons 8 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (POSTPONED FROM JUNE 2 AND 3).

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties of unquestioned hardiness, named:
First, James Comley 20 00
Six distinct varieties of unquestioned hardiness, named:
First, Dr. C. G. Weld 10 00
Single truss of any tender variety, named:
First, Dr. C. G. Weld 2 00

HARDY AZALEAS, FROM ANY OR ALL CLASSES. — Fifteen varieties, one vase of each:

First, James Comley	8 00
Second, Thomas C. Thurlow	5 00

Twelve varieties, one vase of each:

Second, T. C. Thurlow	3 00

Six varieties, one vase of each:

First, John L. Gardner	3 00

Cluster of trusses, one variety:

First, T. C. Thurlow	2 00

Society's Prizes.

PÆONIA OFFICINALIS. — Collection of named varieties:

First, T. C. Thurlow	6 00

TREE PÆONIES. — Collection of single and double varieties, named:

First, T. C. Thurlow	6 00

GERMAN IRISES. — Fifty single blooms of not less than twelve varieties:

First, John L. Gardner	4 00

ORIENTAL POPPIES. — Display:

First, W. N. Craig	3 00

AQUILEGIAS. — Collection, twenty-five vases:

First, Frederick S. Davis	3 00
Second, Joseph H. White	2 00
Third, Oakes Ames	1 00

HARDY ORNAMENTAL TREES AND SHRUBS. — Display of not less than thirty species and varieties, named, cut blooms or foliage:

First, N. T. Kidder	8 00
Second, James Comley	6 00
Third, T. C. Thurlow	4 00

NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each:

First, George H. Grinnell	8 00
Second, Mrs. P. D. Richards	6 00
Third, Miss Genevieve Doran	4 00

VASE OF FLOWERS:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

H. H. Hunnewell, Display of Rhododendrons and Azaleas	25 00
Mrs. A. W. Blake, Display of Azaleas and Rhododendrons	5 00
James Comley, Display of Rhododendrons	5 00
James Comley, Display of Rhododendrons, etc.	5 00
Joseph H. White, Display of Gloxinias	3 00
Dr. C. G. Weld, Display of Flowers	6 00
Mrs. E. M. Gill, " " "	3 00

John L. Gardner. Display of Flowers	2 00
W. N. Craig, " " "	2 00
W. A. Manda, " " "	2 00
Rea Brothers. Display of Hardy Flowers	3 00
Miss Vivien May Norris. Display of Native Plants arranged for Effect.	4 00

JUNE 11.

Gratuities: —

Rea Brothers. Hardy Perennials	6 00
James Comley. Display of Flowers	10 00
Mrs. A. W. Blake, " " "	2 00
Mrs. E. M. Gill, " " "	2 00

PÆONY EXHIBITION.

JUNE 18 (POSTPONED FROM JUNE 11).

HERBACEOUS PÆONIES. — Collection of named varieties, double:	
First, T. C. Thurlow	12 00
Second, Dr. C. G. Weld	10 00
Third, George Hollis	8 00
Collection of named varieties, single:	
First, T. C. Thurlow	6 00
Second, George Hollis	5 00
Specimen Bloom:	
First, Dr. C. G. Weld, for Model of Perfection	2 00
Second, Dr. C. G. Weld, for Blanche Neige	1 00
Vase of Blooms on long stems, arranged for effect in the Society's large china vases:	
First, Dr. C. G. Weld	10 00
Second, George Hollis	8 00
Third, Mount Vernon Nursery	6 00
FOXGLOVES. — Twelve spikes:	
First, John L. Gardner	3 00
Second, Miss M. S. Walker	2 00
Third, W. N. Craig	1 00

Gratuities: —

Mrs. David Low, Display of Pæonies	1 00
Estate of Joseph S. Fay. Display of Rhododendrons	3 00
Mrs. E. M. Gill, Display of Roses	3 00
William H. Spooner, " " "	2 00
William Nicholson, Display of Carnations	3 00
Rea Brothers, Display of Pyrethrums	1 00
John L. Gardner. Display of Foxgloves	1 00
Rea Brothers. Display of Herbaceous Perennials	3 00

James Comley, Display of Flowers 12 00
W. N. Craig, " " " 3 00
Oakes Ames, " " " 2 00
Mrs. A. W. Blake, " " " 2 00
Mrs. E. M. Gill, " " " 2 00
G. L. Clarke, " " " 1 00
Mrs. P. D. Richards, Display of Native Plants 2 00
Miss Genevieve Doran, " " " " 1 00

ROSE EXHIBITION.

JUNE 23 AND 24.

Special Prizes, Theodore Lyman Fund.

HARDY ROSES. — Twenty-four distinct named varieties, three of each variety:
First, Estate of Joseph S. Fay 25 00

Society's Prizes.

Sixteen named varieties, three of each variety:
First, Estate of Joseph S. Fay 15 00
Twelve named varieties, three of each:
First, Joseph H. White 10 00
Second, Dr. O. S. Paige 3 00
Six named varieties, three of each:
First, Estate of Joseph S. Fay 6 00
Second, Mrs. A. W. Blake 4 00
Three named varieties, three of each:
First, Joseph H. White 3 00
Second, Estate of Joseph S. Fay 2 00
Twenty-four named varieties, one of each:
First, Dr. O. S. Paige 10 00
Second, Estate of Joseph S. Fay 8 00
Eighteen named varieties, one of each:
First, Joseph H. White 8 00
Second, Estate of Joseph S. Fay 6 00
Twelve named varieties, one of each:
First, Dr. C. G. Weld 6 00
Second, Joseph H. White 4 00
Third, Estate of Joseph S. Fay 2 00
Six named varieties, one of each:
First, E. S. Converse 4 00
Second, Joseph H. White 3 00
Third, Estate of Joseph S. Fay 2 00
Twenty-four blooms of Mme. Gabriel Luizet:
First, Estate of Joseph S. Fay 8 00
Second, Dr. O. S. Paige 6 00

Six blooms of Baroness Rothschild:
First, Mrs. A. W. Blake 3 00
Second, Dr. O. S. Paige 2 00
Six blooms of John Hopper:
Second, Dr. O. S. Paige 2 00
Twelve blooms of any other variety:
First, Dr. O. S. Paige 4 00
Second, Dr. C. G. Weld 3 00
Best single bloom of any variety:
First, Dr. O. S. Paige 2 00
Moss Roses. — Six named varieties, three clusters of each:
First, John L. Gardner 3 00
Second, Dr. C. G. Weld 2 00
General Display. — One hundred bottles of Hardy Roses, buds admissible, each exhibitor limited to one entry:
First, Mrs. E. M. Gill 10 00
Second, W. N. Craig 9 00
Third, Mrs. B. P. Cheney 8 00
Fourth, Dr. O. S. Paige 7 00
Fifth, Miss M. S. Walker 6 00
Sixth, John L. Gardner 5 00
Basket of Roses. — Arranged for effect, to be shown the second day:
First, Mrs. E. M. Gill 5 00
Sweet Williams. — Thirty spikes, not less than six varieties:
First, W. N. Craig 4 00
Second, Miss M. S. Walker 3 00
Third, Mrs. A. W. Blake 2 00
Spanish Irises. — Display:
First, John Jeffries 3 00
Second, Walter H. Cowing 2 00
Vase of Flowers. — Best arranged:
First, Mrs. E. M. Gill 5 00
Second, Miss Hattie B. Winter 4 00

Gratuities: —

Estate of Joseph S. Fay, Display of Roses 10 00
Mrs. E. M. Gill, " " " 3 00
William H. Spooner, " " " 2 00
Oakes Ames, Sweet Williams 1 00
T. C. Thurlow, Display of Pæonies 5 00
George Hollis, " " " 4 00
Estate of Joseph S. Fay, " " " 3 00
T. C. Thurlow, " " " 1 00
Robert Laurie, Display of Fringed Begonias 5 00
W. E. Coburn, Display of Pelargoniums 1 00
John Jeffries, Foxgloves 1 00

Robert Laurie, Chrysanthemum Independence	1 00
W. N. Craig, Display of Flowers	6 00
James Comley, " " "	5 00
A. F. Estabrook, " " "	2 00
James Comley, Vase of Flowers	5 00
Rea Brothers, Hardy Flowers	2 00
Miss Vivien May Norris, Native Grasses	1 00
Mrs. P. D. Richards, Native Flowers	1 00

July 2.

Iris Kæmpferi. — Fifteen varieties, three of each, in vases:	
First, John L. Gardner	6 00
Six varieties, three of each, in vases:	
First, John L. Gardner	4 00
Second, Miss M. S. Walker	3 00
Campanula Medium. — Collection, not less than fifteen bottles:	
First, John L. Gardner	5 00
Sweet Williams. — Auricula-flowered, thirty spikes, of not less than six distinct varieties:	
Second, W. N. Craig	2 00
Delphiniums. — Collection of twenty spikes, not less than five varieties:	
First, John L. Gardner	5 00
Second, Mrs. A. W. Blake	4 00
Third, Rea Brothers	3 00
Herbaceous Plants. — Thirty bottles:	
First, W. N. Craig	8 00
Second, Rea Brothers	6 00
Third, George L. Clark	4 00
Vase of Flowers. —	
First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00

Gratuities: —

Mrs. B. P. Cheney, Display of Roses	3 00
Mrs. B. P. Cheney, Display of Gloxinias	3 00
George Hollis, Display of Geraniums	2 00
James Comley, Display of Flowers	8 00
W. N. Craig, " " "	2 00
Mrs. E. M. Gill, " " "	2 00
Miss Genevieve Doran, Display of Native Plants	2 00

July 9.

Hollyhocks. — Single, twelve spikes:	
Second, John L. Gardner	3 00

NATIVE PLANTS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

First, Mrs. W. S. Eager	8 00
Second, Misses Eleanor A. and Mollie S. Doran	6 00
Third, Miss Genevieve Doran	4 00

VASE OF FLOWERS. — Best arranged:

First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00

Gratuities: —

E. Shepperd & Son, Display of Irises	1 00
R. & J. Farquhar & Co., Display of Lilies and Irises	2 00
W. N. Craig, Display of Phloxes and Roses	2 00
Rea Brothers, Display of Herbaceous Plants	2 00
Mrs. A. W. Blake, Display of Flowers	1 00
Miss Vivien May Norris, Native Plants	4 00

JULY 16.

TUBEROUS BEGONIAS. — Collection arranged with their own foliage, in flat dishes:

First, E. S. Converse	4 00
Second, James L. Little	3 00
Third, James L. Little	2 00

HARDY FERNS. — Collection of named species and varieties:

First, Miss Alice L. Grinnell	6 00

Gratuities: —

John L. Gardner, Display of Hollyhocks	4 00
E. C. Lewis, " " "	1 00
W. N. Craig, Hollyhocks and Sweet Peas	3 00
R. & J. Farquhar & Co., Display of Lilies	4 00
James L. Little, Display of Gloxinias	3 00
Rea Brothers, Display of Hardy Perennials	1 00
Mrs. E. M. Gill, Display of Flowers	3 00
E. Sheppard & Sons, " " "	1 00
Misses Eleanor A. and Mollie S. Doran, Native Plants	2 00
Miss Alice L. Grinnell, Native Plants	1 00

JULY 23.

SWEET PEAS. — Display of named varieties, filling thirty vases, arranged with their foliage:

First, H. B. Watts	6 00
Second, F. A. Blake	4 00
Third, F. E. Chaffin	3 00

Display of named varieties in vases, six sprays in each vase:

First, H. B. Watts	4 00
Second, F. A. Blake	3 00
Third, W. H. Harrison	2 00

HERBACEOUS PLANTS. — Thirty bottles:

First, W. N. Craig	8 00
Second, Rea Brothers	6 00

VASE OF FLOWERS. — For table decoration:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

A. S. Messer, Display of Hollyhocks	3 00
George Hollis, *Convolvulus palmata*	1 00
W. N. Craig, Display of Flowers	2 00
E. C. Lewis, " " "	2 00
Miss Alice L. Grinnell, Native Plants	1 00

JULY 30.

PERENNIAL PHLOXES. — Twelve named varieties, one spike of each:

First, Rea Brothers	3 00
Second, George Hollis	2 00

ANTIRRHINUMS. — Display of thirty vases, not less than ten varieties, three spikes of each:

First, William H. Lincoln	4 00
Second, John Jeffries	3 00

NATIVE FLOWERS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

First, Mrs. W. S. Eager	8 00
Second, Mrs. P. D. Richards	6 00
Third, Miss Genevieve Doran	4 00

Gratuities: —

T. C. Thurlow, Phlox	2 00
John L. Gardner, Display of Flowers	3 00
Rea Brothers, " " "	2 00
James Comley, " " "	1 00
Mrs. E. M. Gill, " " "	1 00

AUGUST 6.

ANNUALS. — General display, named, filling not less than one hundred and fifty bottles:

First, John L. Gardner	10 00

Gratuities: —

Mrs. E. M. Gill, Display of Annuals	2 00
Rea Brothers, Display of *Veronica longifolia subsessilis*, Phlox, etc.,	4 00
R. & J. Farquhar & Co., Display of Auratum Lilies	3 00
E. S. Converse, Display of Tuberous Begonias	1 00
Mrs. P. D. Richards, Display of Native Plants	3 00
Miss Alice L. Grinnell, " " " "	2 00

August 13.

Gladioli. — Ten named varieties, in spikes:

First, J. Warren Clark	3 00
Second, John L. Gardner	2 00

Six varieties, named, in spikes:

First, J. Warren Clark	2 00

Display of named and unnamed varieties, filling one hundred vases, arranged for effect, with any foliage:

First, J. Warren Clark	8 00

Montbretia. — Display in vases:

First, Bussey Institution	3 00
Second, John L. Gardner	2 00

Perennial Phloxes. — Collection of eighteen named varieties:

First, George Hollis	4 00
Second, Rea Brothers	3 00
Third, T. C. Thurlow	2 00

Gratuities: —

T. C. Thurlow, Display of Phlox	2 00
James Comley, Display of Flowers	3 00
R. P. Struthers, " " "	1 00
Mrs. E. A. Wilkie, " " "	1 00
Miss Alice L. Grinnell, Display of Native Plants	4 00
Misses Eleanor A. and Mollie S. Doran, Display of Native Plants	3 00
Mrs. P. D. Richards, Display of Native Plants	2 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

August 20.

Theodore Lyman Fund.

Aquatics. — General display of Nymphæas, Nelumbiums, Sedges, Papyrus, and other aquatic plants, arranged for effect, to include not less than twenty-five blooms of Nymphæas:

First, Henry A. Dreer, Philadelphia	40 00

Display of twelve Nymphæas and Nelumbiums, named:

First, Henry A. Dreer	8 00

Asters. — Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase:

First, C. H. Souther	6 00
Second, John L. Gardner	5 00

Truffaut's Pæony Flowered Aster, thirty blooms, not less than twelve varieties:

First, C. H. Souther	4 00

Victoria Flowered, thirty blooms, not less than twelve varieties:

First, C. H. Souther	4 00
Third, Mrs. A. W. Blake	2 00

HERBACEOUS PLANTS. — Thirty bottles:
First, W. N. Craig 8 00

Gratuities: —

J. Warren Clark, Display of Gladioli 3 00
William C. Winter, Display of Dahlias 2 00
John Parker, " " " 1 00
George Hollis, Collection of Phloxes 2 00
Rea Brothers, " " " 2 00
W. N. Craig, Cannas and Gloxinias 2 00
Bussey Institution, *Montbretia crocosmiflora* 1 00
James Comley, Display of Flowers 1 00
Miss Alice L. Grinnell, Native Plants 3 00
Mrs. P. D. Richards, " " 3 00
Misses Eleanor A. and Mollie S. Doran, Native Plants . . . 1 00

AUGUST 27.

Gratuities: —

J. Warren Clark, Display of Gladioli 1 00
James Comley, Display of Flowers 2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

DAHLIAS. — Show, eighteen blooms, named varieties:
First, H. F. Burt 4 00
Second, William C. Winter 3 00
Fancy, eighteen blooms, named varieties:
First, H. F. Burt 4 00
Cactus, twelve blooms, named varieties:
First, Lothrop & Higgins 4 00
Decorative, twelve blooms, named varieties:
First, Lothrop & Higgins 4 00
Show, six blooms, named varieties:
First, Lothrop & Higgins 2 00
Second, H. F. Burt 1 00
Fancy, six blooms, named varieties:
First, H. F. Burt 2 00
Second, H. F. Burt 1 00
Best single bloom of any class, introduction of 1896, or later:
Lothrop & Higgins 1 00
Pompon, twelve vases of three blooms each, named varieties:
First, L. W. Snow 3 00
Second, William C. Winter 2 00
Third, H. F. Burt 1 00

General Display, all classes admissible, one hundred or more bottles:

First, W. W. Rawson & Co.	12 00
Second, William C. Winter	10 00
Third, Lothrop & Higgins	8 00
Fourth, H. F. Burt	6 00

Hardy Lilies. — Collection of named varieties:

First, Sumner Coolidge	4 00

Tropæolums. — Display, with their own foliage, filling twenty-five vases, not over twelve blooms of one variety in each:

First, Dr. C. G. Weld	3 00
Second, James L. Little	2 00

Double Zinnias. — Fifty flowers, not less than twelve varieties:

First, Dr. C. G. Weld	3 00
Second, James Comley	2 00

Native Plants. — Collection, not exceeding forty bottles, of named species and varieties, one bottle of each:

First, Misses Eleanor A. and Mollie S. Doran	8 00
Second, Mrs. P. D. Richards	6 00
Third, Mrs. W. S. Eager	4 00

Vase of Flowers. — For table decoration, on the last day of the exhibition:

Second, Mrs. E. M. Gill	3 00
Third, Miss Hattie B. Winter	2 00

Gratuities: —

R. & J. Farquhar & Co., Display of Cannas	2 00
J. W. Howard, Display of Cannas	1 00
J. Warren Clark, Display of Gladioli	2 00
Dr. C. G. Weld, Display of Asters	1 00
James L. Little, Display of Begonias	1 00
Rea Brothers, Display of Hardy Perennials	2 00
James Comley, Display of Flowers	3 00
Mrs. E. M. Gill, " " "	1 00
Miss Alice L. Grinnell, Display of Native Plants	1 00

September 3.

Gratuity: —

Robert Laurie, Tuberous Begonias	1 00

September 10.

Herbaceous Plants. — Thirty bottles:

First, W. N. Craig	8 00
Second, Rea Brothers	6 00

Gratuities: —

Lothrop & Higgins, Display of Dahlias	1 00
L. W. Goodell, Display of Phlox and Zinnias	1 00

L. W. Goodell, Display of Nymphæas 2 00
Mrs. E. M. Gill, Display of Flowers 1 00

SEPTEMBER 17.

PERENNIAL ASTERS. — Collection of Native or Introduced species and varieties:
First, Mrs. P. D. Richards 5 00
Second, Mrs. E. M. Gill 4 00
Third, Misses Eleanor A. and Mollie S. Doran 3 00

Gratuities: —
Lothrop & Higgins, Display of Cactus and Decorative Dahlias . 2 00
John F. Colan, *Celosia cristata* 1 00
James Comley, Display of Flowers 5 00
Rea Brothers, " " " 1 00

SEPTEMBER 24.

Gratuities: —
Lothrop & Higgins, Display of Show and Fancy Dahlias . . . 2 00
Mrs. E. M. Gill, Display of Dahlias 1 00

OCTOBER 1.

Gratuity: —
Lothrop & Higgins, Display of Dahlias 4 00

OCTOBER 15.

Gratuities: —
William C. Winter, Display of Dahlias 2 00
Mrs. E. M. Gill, " " " 1 00

OCTOBER 29.

Gratuity: —
James Comley, Display of Flowers 2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 8, 9, 10, AND 11.

Special Prizes.

Josiah Bradlee Fund.

CHRYSANTHEMUMS. — Twenty-five blooms of twenty-five distinct varieties, named, a piece of plate, or value in money:
First, Mrs. B. P. Cheney 20 00
Second, Robert Laurie, Newport, R.I. 15 00
Third, David Nevins 10 00
Six vases of six named varieties, ten blooms each:
First, Waban Conservatories 30 00
Second, Mrs. B. P. Cheney 26 00
Third, David Nevins 20 00

Society's Prizes.

Twelve cut blooms, Incurved, named, in vases:	
First, Joseph H. White	8 00
Second, C. H. Souther	6 00
Third, Dr. C. G. Weld	4 00
Twelve cut blooms, Japanese Incurved, named:	
First, C. H. Souther	10 00
Second, Mrs. B. P. Cheney	6 00
Third, N. T. Kidder	4 00
Twelve cut blooms, Anemone, named, in vases:	
First, C. H. Souther	8 00
Second, James L. Little	6 00
Third, Dr. C. G. Weld	4 00
Six cut blooms, Incurved, named, in vases:	
First, C. H. Souther	5 00
Second, Joseph H. White	4 00
Third, John Jeffries	2 00
Six cut blooms, Japanese, named, in vases:	
First, C. H. Souther	6 00
Second, Mrs. B. P. Cheney	4 00
Third, James L. Little	2 00
Six cut blooms, Japanese Incurved, named, in vases:	
First, Joseph H. White	6 00
Second, Mrs. B. P. Cheney	4 00
Third, Edwin Whitin	2 00
Six cut blooms, Anemone, named, in vases:	
First, E. S. Converse	5 00
Second, James L. Little	4 00
Third, John Shepherd	2 00
Twelve sprays, Pompons, naturally grown, stems twenty-four inches or over, not less than six named varieties:	
First, William C. Winter	4 00
Twelve best varieties, named, introductions of the current year:	
First, J. W. Howard	8 00
Vase of ten blooms, on long stems, Pink, named:	
First, David Nevins	10 00
Second, Robert Laurie	8 00
Third, Robert Laurie	6 00
Vase of ten blooms on long stems, Red, named:	
First, David Nevins	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Alexander Frazer	6 00
Vase of ten blooms, on long stems, White, named:	
First, Waban Conservatories	10 00
Second, Mrs. B. P. Cheney	8 00
Third, David Nevins	6 00

Vase of ten blooms, on long stems, Yellow, named:
First, Waban Conservatories 10 00
Second, David Nevins 8 00
Third, Waban Conservatories 6 00
Vase of blooms on long stems, arranged in the Society's large china vases, to be kept in good condition during the exhibition:
First, David Nevins 20 00
Second, C. H. Souther 18 00
Fifth, Miss Eleanor J. Clark 12 00
Best Seedling, never disseminated, six blooms, White:
George Hollis, for Peerless 5 00
Best Seedling, never disseminated, six blooms, Yellow:
Ernst G. Asmus, for Mrs. Trenor L. Park 5 00

Gratuities:—

Mrs. E. M. Gill, Display of Chrysanthemums 8 00
Mrs. B. P. Cheney, " " " 7 00
Mrs. B. P. Cheney, " " " 4 00
James Comley, " " " 6 00
S. J. Goddard, " " " 4 00
James Garthley, " " " 2 00
John Jeffries, " " " 1 00
H. Dumaresq, Two Vases of Chrysanthemums 6 00
David Nevins, " " " " 5 00
William W. Edgar, Vase of Chrysanthemum Mrs. Weeks . . 2 00
J. Fuller, Chrysanthemum Wachusett 2 00
Peter Fisher, Vase of Carnation Mrs. Thomas Lawson . . . 2 00
J. W. Howard, Seedling Carnations 3 00
S. J. Goddard, Display of Carnations 1 00
Carl Jurgens, Vase of Rose Kaiserin Augusta Victoria . . . 2 00
Dr. C. G. Weld, Collection 5 00

NOVEMBER 26.

Gratuity:—

James Comley, Display of Chrysanthemums 1 00

DECEMBER 3.

Gratuities:—

Mrs. E. M. Gill, Display of Flowers 2 00
James Comley, " " " 1 00

DECEMBER 24.

Gratuity:—

George Hollis, Collection of Geraniums 1 00

SOCIETY'S SILVER MEDALS.

January 15. Oakes Ames, for *Cattleya Trianæ* Lilian Chatman.

" " Hon. C. G. Roebling, Trenton, N.J., for *Cattleya Trianæ* var. *Clinkaberryana.*

March 12. Hon. C. G. Roebling, for *Cypripedium Rothschildianum*, Trenton variety.

Spring Exhibition, March 22–25. Peter Fisher, for Carnation Mrs. Thomas Lawson.

June 18. R. & J. Farquhar & Co., for Pyrethrums.

August 20. James Comley, for new Hybrid Magnolia.

October 15. Hon. C. G. Roebling, for *Dendrobium Phalænopsis* var. *Hololeuca.*

October 29. Jackson Dawson, for *Euonymus Bungeanus.*

Chrysanthemum Show, November 8–11. Ernst G. Asmus, for Rose Liberty.

November 19. George McWilliam, for Dipladenia Elizabeth K. Whitin.

KELWAY SILVER GILT MEDAL.

Pæony Exhibition, June 18. Dr. C. G. Weld, for the best collection of eighteen named varieties of *Pæonia albiflora*, single or double.

KELWAY BRONZE MEDAL.

Pæony Exhibition, June 18. T. C. Thurlow, for second best collection of eighteen named varieties of *Pæonia albiflora*, single or double.

FIRST CLASS CERTIFICATES OF MERIT.

February 12. W. W. Lunt, for Cypripedium William Wallace Lunt.

April 23. James E. Rothwell, for Cypripedium Eleanor Rothwell.

May 7. Hon. C. G. Roebling, for *Cypripedium Lawrenceanum* var. *Hyeanum.*

May 14. R. & J. Farquhar & Co., for *Narcissus bicolor* var. Victoria.

June 18. T. C. Thurlow, for *Philadelphus Lemoinei.*

July 21. W. W. Lunt, for *Dendrobium thyrsiflorum* var. *Hinghamense.*

" " Hon. C. G. Roebling, for *Lælio-Cattleya Canhamiana alba.*

August 20. Henry A. Dreer, for Cannas and Petunias.

" " Henry A. Dreer, for *Nymphæa Gladstoniana.*

October 1. Lothrop & Higgins, for Cactus Dahlias.

October 15. Hon. C. G. Roebling, for *Cattleya labiata* var. *alba.*

October 29. Jackson Dawson, for *Ribes fasciculatum* var. *Chinensis.*

" " R. & J. Farquhar & Co., for Salvia Sapphire.

November 9. Hon. C. G. Roebling, for *Renanthera Lowii.*

December 3. Hon. C. G. Roebling, for *Cypripedium Sanderianum.*

HONORABLE MENTION.

February 12. Hon. C. G. Roebling, for *Cattleya Trianæ* var. Emily M. Roebling.

March 12. R. & J. Farquhar & Co., for *Narcissus bicolor* var. Victoria.

Spring Exhibition, March 22–25. Frank Niquet, for Carnation Maud Adams.
Rose and Strawberry Exhibition, June 23 and 24. Jackson Dawson, for Seedling Roses.
August 20. J. Warren Clark, for Seedling Gladioli.
" " J. Warren Clark, for *Gladiolus Nanceianus* Seedlings.
August 27. J. Warren Clark, for Gladiolus Yellow Bird.
Annual Exhibition of Plants and Flowers, August 31 and September 1. Jackson Dawson, for *Polygonum compactum*.
September 10. Oakes Ames, for Collection of Hardy Nymphæas.
" " Henry A. Dreer, Philadelphia, for *Nymphæa Heusteriana*.
September 17. George McWilliam, for Dipladenia Elsa Whitin.
October 29. R. & J. Farquhar & Co., for new double blush Anemone Japonica.
Chrysanthemum Show, November 8–11. John H. Taylor, for Rose Admiral Dewey.
November 8–11. John H. Dunlop, for Rose Lady Dorothea.

J. Woodward Manning,
Michael H. Norton,
Kenneth Finlayson,
Frederick S. Davis,
George E. Davenport,
} *Committee on Flowers.*

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1898.

By E. W. WOOD, Chairman.

The fruit crop has been more evenly distributed among the different species the past season than usual. There has been no abundant crop of any kind except the strawberry, and there has been no marked failure of any of the varieties generally grown in this State.

Strawberries were evidently grown over a larger area than usual, and with favorable conditions the crop was so abundant that, excepting localities favorably situated as regarded markets, there was little or no profit to the growers. In a limited number of cases reported, where the receipts did not equal the expense for picking and marketing, the berries were not picked, but the vines were ploughed under, and the land utilized for other crops.

Reports from all parts of the State give the apple crop as yielding about forty-five per cent of the yearly average, this being the even or bearing year. There was a very full bloom on the trees, but the weather, while they were in blossom, was almost continually wet, and the set of fruit was scattering, and in some places an almost entire failure. While there was about half an average crop, the net receipts to the growers, owing to the higher prices received, were equal to those of 1896, when we had an exceedingly abundant crop, and the trees in many localities having received a rest the past year we may reasonably expect a larger crop of this fruit in 1899 than usual on the odd calendar year.

The exhibits during the year have been larger than usual, and the premiums were nearly all awarded.

No new varieties of fruits deserving special mention were shown, except in strawberries, where several varieties appeared for the first time, which upon further trial may prove desirable additions to those now in general cultivation. The increased exhibits of the Mackintosh apple indicate that it is coming into more general cultivation. It follows the Gravenstein and is a desirable market variety. Most of the fruit shown at the exhibitions is from those who grow for market, being selected specimens from ordinary orchard cultivation, comparatively few being grown specially for exhibition.

Sixteen hundred and seventy-five dollars have been awarded in prizes and gratuities, leaving an unexpended balance of fifty-seven dollars.

For the Committee,

E. W. WOOD,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1898.

SPRING EXHIBITION.

MARCH 22, 23, 24, AND 25.

WINTER APPLES. — Baldwin:

First, Mrs. A. W. Blake	$3 00
Second, C. L. Hartshorn	2 00
Third, George C. Rice	1 00
Northern Spy:	
First, William O'Connell	3 00
Second, George V. Fletcher	2 00
Roxbury Russet:	
First, H. R. Kinney	3 00
Second, Benjamin P. Ware	2 00
Third, C. L. Hartshorn	1 00
Tompkins King:	
First, George C. Rice	3 00
Any other variety:	
First, F. J. Kinney, Mackintosh	3 00
Second, George C. Rice, Fallawater	2 00
Third, C. L. Hartshorn, Rhode Island Greening	1 00

WINTER PEARS. — Any variety:

First, George V. Fletcher, Anjou	3 00
Second, Warren Fenno, Duchess of Bordeaux	2 00

STRAWBERRIES. — One pint:

First, E. S. Converse, Sharpless	3 00
Second, M. R. Cushing, Marshall	2 00

MAY 7.

Gratuities: —

William Brown, Peaches	2 00
William C. Winter, "	1 00
C. L. Hartshorn, Collection of Apples	2 00

MAY 14

Gratuity: —

William Brown, Peaches	1 00

JUNE 7.

Gratuities: —

E. S. Converse, Nectarines	1 00
William C. Winter, Grapes and Peaches	2 00

JUNE 18

Gratuities: —

William Doran & Son, Strawberries	2 00
W. N. Craig, "	1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES. — Four quarts of any variety:

First, Warren Heustis & Son, for Marshall, the Lyman Plate, value	20 00
Second, Estate of Joseph S. Fay, for Marshall, the Lyman Plate, value	16 00
Third, A. M. Davenport, for Marshall, the Lyman Plate, value,	12 00
Fourth, Barnard Farm, " " " " " "	10 00
Fifth, Barnard Farm, for Clyde, the Lyman Plate, value	8 00

Special Prizes offered by the Society.

Two quarts of any variety, best adapted for garden cultivation for home use, to be judged by points:

First, Benjamin M. Smith, Margaret	6 00
Second, I. E. Coburn, Jessie	5 00
Third, Warren Heustis & Son, Marshall	4 00
Fourth, Estate of Joseph S. Fay, Marshall	3 00

Regular Prizes.

For the largest and best collection, not less than fifteen baskets of two quarts each, and not less than five varieties:

First, I. E. Coburn	20 00
Second, George F. Wheeler	15 00

Ten baskets of two quarts each, not less than three varieties:

First, George V. Fletcher	15 00
Second, I. E. Coburn	12 00
Third, George F. Wheeler	10 00

Five baskets, two quarts each, of one variety:

First, Warren Heustis & Son, Marshall	8 00
Second, William Doran & Son, "	6 00
Third, I. E. Coburn, Jessie	5 00
Fourth, George F. Wheeler, Clyde	4 00
Fifth, I. E. Coburn, Clyde	3 00

Two quarts of Belmont:

First, George V. Fletcher	4 00
Second, Warren Heustis & Son	3 00
Third, Mrs. A. W. Blake	2 00

Bubach:

First, Varnum Frost	4 00
Second, Warren Heustis & Son	3 00
Third, George V. Fletcher	2 00

Champion:

First, Barnard Farm	4 00
Second, George F. Wheeler	3 00

Charles Downing:
- First, William Doran & Son 4 00
- Second, Miss M. S. Walker 3 00
- Third, George F. Wheeler 2 00

Clyde:
- First, Barnard Farm 4 00
- Second, George V. Fletcher 3 00
- Third, Warren Heustis & Son 2 00

Crescent:
- First, I. E. Coburn 4 00
- Second, William C. Winter 3 00
- Third, George F. Wheeler 2 00

Cumberland:
- Third, George F. Wheeler 2 00

Haverland:
- First, I. E. Coburn 4 00
- Second, Barnard Farm 3 00
- Third, Levi Doran & Son 2 00

Hersey:
- First, George F. Wheeler 4 00

Jessie:
- First, I. E. Coburn 4 00
- Second, George V. Fletcher 3 00
- Third, William Christie 2 00

Leader:
- First, George F. Wheeler 4 00

Marshall:
- First, Varnum Frost 4 00
- Second, Warren Heustis & Son 3 00
- Third, Estate of Joseph S. Fay 2 00

Miner's Prolific:
- Second, George F. Wheeler 3 00
- Third, Charles S. Smith 2 00

Parker Earle:
- First, I. E. Coburn 4 00
- Second, George F. Wheeler 3 00

Any other variety:
- First, J. C. Haskell, Seedling 4 00
- Second, George F. Wheeler, Enormous 3 00
- Third, William C. Winter 2 00

Collection of not less than six varieties, one quart each:
- First, George V. Fletcher 8 00
- Second, George F. Wheeler 6 00

One quart of any new variety, not previously exhibited:
- First, Estate of Joseph S. Fay 5 00
- Second, Benjamin M. Smith 4 00

CHERRIES. — Two quarts of any variety:

First, O. R. Robbins	4 00
Second, Joshua C. Stone	3 00
Third, George V. Fletcher	2 00

FOREIGN GRAPES.— Two bunches of any variety:

First, E. S. Converse, Black Hamburg	6 00
Second, William C. Winter	4 00

FORCED PEACHES. — Six specimens of any variety:

First, William C. Winter, Waterloo	3 00
Second, William C. Winter, Hale's Early	2 00

JULY 2.

STRAWBERRIES. — Two quarts of any variety:

First, Warren Heustis & Son, Marshall	4 00
Second, Warren Heustis & Son, Belmont	3 00
Third, Benjamin M. Smith, Salem	2 00

CHERRIES. — Two quarts of Black Eagle:

First, E. S. Converse	3 00
Second, F. W. Damon	2 00
Third, Mrs. A. W. Blake	1 00

Black Tartarian:

First, L. M. Chase	3 00
Second, Edwin Hastings	2 00
Third, George V. Fletcher	1 00

Coe's Transparent:

First, L. M. Chase	3 00
Second, John L. Bird	2 00
Third, Mrs. A. W. Blake	1 00

Downer:

First, M. W. Chadbourne	3 00

Any other variety:

First, George V. Fletcher, Guigne Noir	3 00
Second, M. W. Chadbourne, Governor Wood	2 00
Third, Charles B. Travis, Elton	1 00

JULY 9.

RASPBERRIES. — Two quarts of any variety:

First, Benjamin G. Smith, Franconia	3 00
Second, William Doran & Son, Antwerp	2 00

CURRANTS. — Two quarts of any Red variety:

First, W. N. Craig, Versaillaise	4 00
Second, W. N. Craig, Fay's	3 00
Third, E. A. Weeks, "	2 00
Fourth, Francis Blake, "	1 00

Two quarts of any White variety:

First, W. N. Craig, White Grape	3 00
Second, E. S. Converse, White Grape	2 00

Gooseberries. — Two quarts of any variety of American origin:

First, W. N. Craig, Columbus	4 00
Second, W. N. Craig, Triumph	3 00
Third, Joseph S. Chase, "	2 00
Fourth, Mrs. A. W. Blake, Triumph	1 00

Gratuities: —

M. W. Chadbourne, Cherries	1 00
John L. Bird, "	1 00
A. T. Brown, "	1 00
Miss Vera Chapell, "	1 00
W. N. Craig, "	1 00
Warren Heustis & Son, Strawberries	1 00
William C. Winter, Peaches and Grapes	2 00

July 16.

Raspberries. — Two quarts of any variety:

First, Miss E. J. Cutter	3 00
Second, William Doran & Son	2 00
Third, Benjamin G. Smith	1 00

Currants. — One quart of any Red variety:

First, W. N. Craig, Versaillaise	3 00
Second, W. N. Craig, Fay's	2 00
Third, George V. Fletcher, Versaillaise	1 00

One quart of any White variety:

First, W. N. Craig, White Grape	2 00
Second, Mrs. A. W. Blake, White Grape	1 00

Gooseberries. — Two quarts of any foreign variety:

First, B. G. Smith, Hero of the Nile	4 00
Second, " " Ashton	3 00
Third, " " Eshender Bey	2 00
Fourth, " " Abbotsford	1 00

Gratuities: —

James L. Duncan, Cherries	1 00
W. N. Craig, "	1 00

July 23.

Blackberries. — Two quarts of any variety:

First, M. W. Chadbourne	3 00

Apples. — Tetofsky:

First, H. K. W. Hall	3 00
Second, George Nelson	2 00

Yellow Transparent:

First, George Nelson	3 00
Second, William C. Winter	2 00

PEARS. — Summer Doyenne:

First, E. S. Converse	3 00
Second, L. M. Chase	2 00
Third, Joshua C. Stone	1 00

PEACHES. — Six of any variety:

First, William C. Winter	3 00

Gratuity: —

W. N. Craig, Currants	1 00

JULY 30.

APPLES. — Red Astrachan:

First, F. W. Damon	3 00
Second, J. L. Bird	2 00
Third, George C. Rice	1 00

Sweet Bough:

First, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, F. J. Kinney	1 00

Any other variety:

First, William C. Winter, Yellow Transparent	3 00
Second, H. K. W. Hall, Tetofsky	2 00
Third, Joshua C. Stone, Williams	1 00

PEARS. — Giffard:

First, Mrs. E. Emmons	3 00
Second, A. T. Brown	2 00
Third, Rufus T. Tobey	1 00

Any other variety:

First, J. L. Bird, Wilder	3 00
Second, Mrs. S. Klaus, Clapp's Favorite	2 00
Third, Joshua C. Stone, " "	1 00

BLACKBERRIES. — Two quarts of any variety:

First, E. C. Lewis	3 00
Second, M. W. Chadbourne	2 00
Third, H. A. Wheeler	1 00

PEACHES. — Outdoor culture, any variety:

First, N. D. Harrington	3 00
Second, George H. Sherwin	2 00

AUGUST 6.

APPLES. — Oldenburg:

First, J. V. Fletcher	3 00
Second, Sumner Coolidge	2 00
Third, Samuel Hartwell	1 00

Any other variety:

First, F. W. Damon, Red Astrachan	3 00
Second, Charles B. Travis, Sweet Bough	2 00
Third, Joshua C. Stone, Williams	1 00

PEARS. — Clapp's Favorite:

First, Sumner Coolidge	3 00
Second, A. T. Brown	2 00
Third, J. V. Fletcher	1 00

Any other variety:

First, Rufus T. Tobey, Giffard	2 00
Second, A. T. Brown, "	1 00

PEACHES. — Twelve specimens of outdoor culture, any variety:

First, Sumner Coolidge, Hale's Early	3 00
Second, George H. Sherwin, Hale's Early	2 00
Third, Warren D. Hinds, Alexander	1 00

Six specimens, cold house or pot culture:

First, William C. Winter, Crawford's Early	3 00
Second, William C. Winter, Crawford's Late	2 00

PLUMS. — Japanese, any variety:

First, W. D. Hinds, Burbank	3 00
Second, W. D. Hinds, Abundance	2 00
Third, W. D. Hinds, Satsuma	1 00

FOREIGN GRAPES. — Two bunches of any variety:

First, E. S. Converse, Black Hamburg	5 00
Second, William C. Winter, Black Hamburg	4 00

AUGUST 13.

APPLES. — Chenango:

First, Sumner Coolidge	3 00
Third, Samuel Hartwell	1 00

Summer Pippin:

First, Warren Fenno	3 00
Second, S. Hartwell	2 00

Williams:

First, Charles F. Curtis	3 00
Second, Joshua C. Stone	2 00
Third, Sumner Coolidge	1 00

Any other variety:

First, Warren Fenno, Red Astrachan	3 00
Second, F. W. Damon	2 00
Third, George V. Fletcher	1 00

PEARS. — Rostiezer:

First, E. S. Converse	3 00
Second, A. T. Brown	2 00
Third, M. W. Chadbourne	1 00

Tyson:

First, Warren Fenno	3 00
Second, John L. Bird	2 00

Any other variety:

First, Sumner Coolidge, Clapp's Favorite	3 00
Second, George V. Fletcher, " "	2 00
Third, A. T. Brown, " "	1 00

PEACHES. — Any variety:
- First, Sumner Coolidge, Early Rivers 3 00
- Second, G. L. Brown, Seedling 2 00

PLUMS, JAPANESE. — Abundance:
- First, E. C. Lewis 3 00
- Second, Warren D. Hinds 2 00
- Third, Samuel Hartwell 1 00

Burbank:
- First, W. D. Hinds 3 00

Gratuities: —

E. S. Converse, Apricots 1 00
T. C. Thurlow, Ohmer Blackberries 1 00

AUGUST 20.

APPLES. — Foundling:
- First, C. M. Handley 3 00

Gravenstein:
- First, Samuel Hartwell 3 00
- Second, C. M. Handley 2 00
- Third, George V. Fletcher 1 00

Maiden's Blush:
- First, H. R. Kinney 3 00
- Second, Joshua C. Stone 2 00
- Third, E. S. Converse 1 00

Porter:
- First, C. M. Handley 3 00
- Second, S. Hartwell 2 00
- Third, M. W. Chadbourne 1 00

Any other variety:
- First, Varnum Frost, Williams 3 00
- Second, Charles F. Curtis, Williams 2 00
- Third, C. M. Handley, Fall Orange 1 00

PEARS. — Andrews:
- First, E. S. Converse 3 00
- Second, J. C. Stone 2 00

Bartlett:
- First, Mrs. S. Klaus 3 00
- Second, A. T. Brown 2 00
- Third, Sumner Coolidge 1 00

Any other variety:
- First, Mrs. S. Klaus, Clapp's Favorite 3 00
- Second, Sumner Coolidge, " " 2 00
- Third, A. T. Brown 1 00

PEACHES. — Single dish of any variety:
- First, Sumner Coolidge, Early Rivers 3 00
- Second, G. L. Brown, Seedling 2 00

PLUMS. — Bradshaw:
First, George V. Fletcher 3 00
Any other variety:
First, W. D. Hinds, Abundance 3 00
Second, E. C. Lewis, " 2 00
NATIVE GRAPES. — Winchell or Green Mountain:
First, H. R. Kinney 3 00
Second, Joseph S. Chase 2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

Special Prizes from the Theodore Lyman Fund.

For the heaviest and best ripened bunch of any Foreign Black Grape:
Second, Miss E. J. Clark, Alicante 10 00
For the heaviest and best ripened bunch of any Foreign White Grape, Syrian excluded:
Second, E. S. Converse, Foster's Seedling 10 00

Society's Prizes.

FOREIGN GRAPES. — Two bunches of Black Alicante:
First, Miss E. J. Clark 5 00
Black Hamburg:
First, Miss E. J. Clark 5 00
Second, E. S. Converse 4 00
Third, William C. Winter 3 00
Golden Hamburg:
First, Miss E. J. Clark 5 00
Second, E. S. Converse 4 00
Muscat of Alexandria:
First, William C. Winter 5 00
Second, E. S. Converse 4 00
Any other variety:
First, E. S. Converse, Foster's Seedling 5 00
Second, E. S. Converse, Blue Chasselas 4 00

Gratuity: —
William C. Winter, Peaches 2 00

SEPTEMBER 10.

APPLES. — Garden Royal:
First, C. M. Handley 3 00
Gravenstein:
First, Samuel Hartwell 3 00
Second, George V. Fletcher 2 00
Third, E. M. Bruce 1 00

Maiden's Blush:
First, H. R. Kinney 3 00
Second, Warren Fenno 2 00
Third, Dr. W. G. Kendall 1 00
Porter:
First, George W. Stevens 3 00
Second, C. M. Handley 2 00
Third, Charles S. Smith 1 00
Pumpkin Sweet:
First, Samuel Hartwell 3 00
Second, G. W. Stevens 2 00
Third, John Parker 1 00
Washington Strawberry:
First, Sumner Coolidge 3 00
Second, Joshua C. Stone 2 00
Third, C. T. Foster 1 00
Any other variety:
First, W. D. Hinds, Wealthy 3 00
Second, Samuel Hartwell, Stump 2 00
Third, Samuel Hartwell, Somerset 1 00
Crab Apples. — Twenty-four specimens of Transcendent:
First, L. J. Fosdick 2 00
Any other variety:
First, C. L. Hartshorn, Hyslop 2 00
Second, Mrs. A. E. Mayell, Siberian 1 00
Pears. — Bartlett:
First, Sumner Coolidge 3 00
Second, A. T. Brown 2 00
Third, Charles F. Curtis 1 00
Belle Lucrative:
First, C. E. Richardson 3 00
Second, Clifford R. Weld 2 00
Third, A. T. Brown 1 00
Boussock:
First, Sumner Coolidge 3 00
Second, Charles E. Swain 2 00
Third, A. M. Leavitt 1 00
Hardy:
First, Rufus T. Tobey 3 00
Second, William Milman 2 00
Third, Charles F. Curtis 1 00
Paradise of Autumn:
First, William Milman 3 00
Second, Warren Fenno 2 00
Third, Rufus T. Tobey 1 00
Souvenir du Congrès:
First, A. T. Brown 3 00

Second, William Christie	2 00
Third, Warren Fenno	1 00
Any other variety:	
First, A. T. Brown, Flemish Beauty	3 00
Second, A. T. Brown, De Tongres	2 00
Third, Charles E. Swain, Seckel	1 00
PEACHES. — Coolidge's Favorite:	
First, Joseph L. Duncan	3 00
Second, Warren D. Hinds	2 00
Third, Sumner Coolidge	1 00
Crawford's Early:	
First, W. D. Hinds	3 00
Second, E. M. Bruce	2 00
Third, Sumner Coolidge	1 00
Crosby:	
First, T. A. Greenleaf	3 00
Second, W. D. Hinds	2 00
Foster:	
First, Charles F. Curtis	3 00
Second, C. R. Safford	2 00
Third, Sumner Coolidge	1 00
Oldmixon Freestone:	
First, W. D. Hinds	3 00
Second, Sumner Coolidge	2 00
Third, Miss E. J. Cutter	1 00
Stump the World:	
First, G. L. Brown	3 00
Any other variety:	
First, W. D. Hinds, Elberta	3 00
Second, T. A. Greenleaf, Mountain Rose	2 00
Third, W. D. Hinds, " "	1 00
NECTARINES, OUTDOOR CULTURE. — Any variety:	
First, C. C. Donnell	4 00
Second, Warren Fenno	3 00
PLUMS. — Imperial Gage:	
First, Sumner Coolidge	3 00
Second, John Parker	2 00
Third, George V. Fletcher	1 00
Jefferson:	
First, Charles F. Curtis	3 00
Lombard:	
First, J. L. Bird	3 00
Second, L. M. Chase	2 00
Third, Joshua C. Stone	1 00
Any other variety:	
First, F. J. Kinney, Bradshaw	3 00
Second, Miss E. J. Cutter, Bradshaw	2 00
Third, George V. Fletcher, "	1 00

Japanese Plums, any variety:
- First, Sumner Coolidge, Burbank 3 00
- Second, W. D. Hinds, Satsuma 2 00
- Third, T. A. Greenleaf 1 00

Native Grapes. — Moore's Early:
- First, F. W. Damon 3 00
- Second, H. R. Kinney 2 00
- Third, Samuel Hartwell 1 00

Any other variety:
- First, E. C. Lewis, Lady Washington 3 00
- Second, F. J. Kinney, Niagara 2 00

Any variety from girdled vines:
- First, F. J. Kinney, Worden 3 00
- Second, H. R. Kinney, Delaware 2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

September 29 and 30.

Special Prizes from the Samuel Appleton Fund.

Apples. — Baldwin, Sumner Coolidge 5 00
Hubbardston, E. M. Bruce 5 00
Pears. — Bosc, Sumner Coolidge 5 00
Sheldon, A. T. Brown 5 00

Benjamin V. French Fund.

Apples. — Gravenstein, Samuel Hartwell 5 00
Rhode Island Greening, C. L. Hartshorn 5 00

Marshall P. Wilder Fund.

Pears. — Anjou:
- First, George V. Fletcher 4 00
- Second, William Milman 3 00
- Third, A. T. Brown 2 00
- Fourth, F. W. Damon 1 00

Bartlett:
- First, Varnum Frost 4 00
- Second, Charles F. Curtis 3 00
- Third, George V. Fletcher 2 00
- Fourth, Sumner Coolidge 1 00

Native Grapes. — Twelve bunches of Concord:
- First, H. R. Kinney 4 00
- Second, William Doran & Son 3 00
- Third, F. J. Kinney 2 00

Twelve bunches of Worden:
- First, F. J. Kinney 4 00
- Second, H. R. Kinney 3 00

Theodore Lyman Fund.

Apples. — Baldwin:	
First, C. L. Hartshorn	4 00
Second, John W. Clark	3 00
Third, Sumner Coolidge	2 00
Dutch Codlin:	
First, Warren Fenno	3 00
Second, Sumner Coolidge	2 00
Third, Joshua C. Stone	1 00
Fall Orange or Holden:	
First, Charles S. Smith	3 00
Second, H. R. Kinney	2 00
Third, C. M. Handley	1 00
Fameuse:	
First, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, M. W. Chadbourne	1 00
Fletcher Russet:	
First, George V. Fletcher	3 00
Second, John Fletcher	2 00
Third, C. F. Curtis	1 00
Gloria Mundi:	
First, Samuel Hartwell	3 00
Second, E. M. Bruce	2 00
Golden Russet:	
First, George V. Fletcher	2 00
Second, H. R. Kinney	1 00
Gravenstein:	
First, Samuel Hartwell	4 00
Second, E. M. Bruce	3 00
Third, George Nelson	2 00
Hubbardston:	
First, C. L. Hartshorn	4 00
Second, John W. Clark	3 00
Third, E. M. Bruce	2 00
Hunt Russet:	
First, W. H. Hunt	3 00
Second, E. M. Bruce	2 00
Third, Samuel Hartwell	1 00
Jacobs Sweet:	
First, Charles F. Curtis	3 00
Second, M. Martin	2 00
Lady's Sweet:	
First, C. C. Shaw	2 00
Second, David L. Fiske	1 00
Mackintosh:	
First, F. J. Kinney	4 00

Second, Samuel Hartwell	3 00
Third, C. C. Shaw	2 00
Maiden's Blush:	
First, Warren Fenno	2 00
Second, H. R. Kinney	1 00
Mother:	
First, Warren Fenno	3 00
Second, H. R. Kinney	2 00
Third, George C. Rice	1 00
Northern Spy:	
First, C. L. Hartshorn	3 00
Second, George V. Fletcher	2 00
Third, Warren Fenno	1 00
Porter:	
First, Charles S. Smith	3 00
Second, Sumner Coolidge	2 00
Third, George V. Fletcher	1 00
Pound Sweet:	
First, George V. Fletcher	3 00
Second, George C. Rice	2 00
Third, Samuel Hartwell	1 00
Rhode Island Greening:	
First, C. C. Shaw	4 00
Second, Joshua C. Stone	3 00
Third, George V. Fletcher	2 00
Roxbury Russet:	
First, Mrs. E. J. Cutter	4 00
Second, Sumner Coolidge	3 00
Third, Jacob A. Leonard	2 00
Sutton:	
First, C. L. Hartshorn	3 00
Second, E. M. Bruce	2 00
Third, George C. Rice	1 00
Tolman's Sweet:	
First, W. P. Plimpton	3 00
Second, Jacob A. Leonard	2 00
Third, George Nelson	1 00
Tompkins King:	
First, George C. Rice	3 00
Second, J. A. King	2 00
Third, Samuel Hartwell	1 00
Washington Royal or Palmer:	
First, E. M. Bruce	3 00
Second, George C. Rice	2 00
Third, O. B. Hadwen	1 00
Wealthy:	
First, W. D. Hinds	3 00

Second, C. M. Handley 2 00
Third, George C. Rice 1 00
Any other variety:
First, George C. Rice, Fallawater 3 00
Second, William Doran & Son, Bellflower 2 00
Third, Mrs. Mary T. Goddard. " 1 00
Crab Apples. — Hyslop, twenty-four specimens:
First, W. D. Hinds 2 00
Second, M. W. Chadbourne 1 00
Any other variety, twenty-four specimens:
First, F. J. Kinney 2 00

Special Prizes offered by the Society.

Pears. — Anjou, Ellwanger & Barry 5 00
Seckel, A. T. Brown 5 00
Peaches. — Any variety, Sumner Coolidge 5 00
Native Grapes. — Any variety, E. A. Adams 5 00

Society's Regular Prizes.

Pears. — Angouleme:
First, W. S. Janvrin 4 00
Second, A. T. Brown 3 00
Third, Mrs. E. Emmons 2 00
Fourth, F. W. Damon 1 00
Bosc:
First, Charles E. Swain 4 00
Second, A. T. Brown 3 00
Third, Charles F. Curtis 2 00
Fourth, John C. Davenport 1 00
Clairgeau:
First, Charles F. Curtis 3 00
Second, W. S. Janvrin 2 00
Third, Sumner Coolidge 1 00
Comice:
First, A. T. Brown 3 00
Second, Mrs. E. Emmons 2 00
Third, Warren Fenno 1 00
Dana's Hovey:
First, A. T. Brown 4 00
Second, Charles E. Swain 3 00
Third, George V. Fletcher 2 00
Fourth, A. C. Osborn 1 00
Diel:
First, Charles E. Swain 3 00
Second, Mrs. E. Emmons 2 00
Third, A. T. Brown 1 00

Fulton:	
First, E. S. Converse	3 00
Second, S. F. & F. L. Weston	2 00
Hardy:	
First, Samuel Hartwell	3 00
Second, Rufus T. Tobey	2 00
Third, William Milman	1 00
Howell:	
First, Abram K. Gould	3 00
Second, Warren Fenno	2 00
Third, J. E. Fuller	1 00
Josephine of Malines:	
First, Warren Fenno	3 00
Second, David L. Fiske	2 00
Lawrence:	
First, Mrs. E. Emmons	3 00
Second, A. T. Brown	2 00
Third, L. M. Chase	1 00
Louise Bonne of Jersey:	
First, C. E. Richardson	3 00
Second, Mrs. James McCormick	2 00
Third, A. T. Brown	1 00
Marie Louise:	
First, Charles E. Swain	3 00
Second, Elbridge Torrey	2 00
Third, Warren Fenno	1 00
Merriam:	
First, Charles F. Curtis	3 00
Second, Sumner Coolidge	2 00
Third, F. W. Damon	1 00
Onondaga:	
First, Sumner Coolidge	3 00
Second, Charles B. Travis	2 00
Seckel:	
First, Charles E. Swain	4 00
Second, A. T. Brown	3 00
Third, Mrs. S. Klaus	2 00
Fourth, William Milman	1 00
Sheldon:	
First, A. T. Brown	4 00
Second, Elbridge Torrey	3 00
Third, Charles E. Swain	2 00
Fourth, Clifford R. Weld	1 00
St. Michael Archangel:	
First, Warren Heustis & Son	3 00
Second, Warren Fenno	2 00
Third, Benjamin G. Smith	1 00

Superfin:
First, Mr. Ward 3 00
Second, Warren Fenno 2 00
Third, Sumner Coolidge 1 00
Urbaniste:
First, Mrs. E. Emmons 3 00
Second, E. S. Converse 2 00
Third, A. T. Brown 1 00
Vicar:
First, Mrs. Jones 3 00
Second, E. S. Converse 2 00
Third, A. T. Brown 1 00
Winter Nelis:
First, A. T. Brown 3 00
Second, Clifford R. Weld 2 00
Third, Mrs. E. Emmons 1 00
Any other variety:
First, Mrs. E. Emmons, Mount Vernon 3 00
Second, A. T. Brown, Souvenir du Congrès 2 00
Third, A. T. Brown, Flemish Beauty 1 00

Quinces. — Champion:
First, George V. Fletcher 3 00
Second, Charles B. Travis 2 00
Orange:
First, Arthur F. Coolidge 3 00
Second, George V. Fletcher 2 00
Third, Joshua C. Stone 1 00
Pear:
First, G. L. Brown 3 00
Second, Benjamin G. Smith 2 00
Third, George V. Fletcher 1 00
Rea:
First, Mrs. Mary T. Goddard 3 00
Second, Warren Fenno 2 00

Peaches. — Crawford's Late:
First, Mrs. Mary T. Goddard 3 00
Second, N. D. Harrington 2 00
Third, E. M. Bruce 1 00
Any other variety:
First, E. M. Bruce 3 00
Second, Sumner Coolidge 2 00
Third, T. A. Greenleaf 1 00

Plums. — Coe's Golden Drop:
First, Abram K. Gould 2 00
Yellow Egg:
First, George V. Fletcher 2 00

Any other variety:
First, W. D. Hinds 2 00
Second, T. A. Greenleaf 1 00

NATIVE GRAPES. — Six bunches of Brighton:
First, E. A. Adams 3 00
Second, Joseph S. Chase 2 00
Third, E. M. Bruce 1 00

Delaware:
First, H. R. Kinney 4 00
Second, F. W. Damon 3 00
Third, J. S. Chase 2 00

Herbert:
First, E. A. Adams 3 00
Second, J. S. Chase 2 00
Third, E. C. Lewis 1 00

Iona:
First, F. W. Damon 3 00
Second, J. S. Chase 2 00

Lindley:
First, Benjamin G. Smith 3 00

Niagara:
First, George A. Wills 3 00
Second, Frank G. Wellington 2 00
Third, J. S. Chase 1 00

Pocklington:
First, T. H. Jackman 4 00
Second, J. S. Chase 3 00
Third, Sumner Coolidge 2 00

Prentiss:
First, J. S. Chase 3 00
Second, Benjamin G. Smith 2 00

Wilder:
First, E. A. Adams 3 00
Second, Benjamin G. Smith 2 00
Third, E. C. Lewis 1 00

Any other variety:
First, John Parker 3 00
Second, H. R. Kinney 2 00
Third, J. S. Chase 1 00

Any variety from girdled vines:
First, H. R. Kinney 3 00
Second, F. J. Kinney 2 00

FOREIGN GRAPES. — Two bunches of any variety, cold-house culture:
First, Benjamin G. Smith 5 00
Second, E. S. Converse 4 00

CRANBERRIES. — Half-peck:
First, L. J. Fosdick 3 00

Gratuities : —

Samuel Hartwell, Gravenstein Apples	3 00
H. A. Wheeler, Collection of Apples	1 00
Warren D. Hinds, Edible Nuts	1 00
Warren Fenno, Collection	3 00
James Comley, "	2 00
M. W. Chadbourne, "	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 5.

Benjamin V. French Fund.

APPLES. — Baldwin, C. F. Boyden	5 00
Rhode Island Greening, C. L. Hartshorn	5 00

Society's Prizes.

APPLES. — Baldwin :	
First, E. M. Bruce	3 00
Second, William C. Clapp	2 00
Third, C. L. Hartshorn	1 00
Danvers Sweet :	
First, Warren Fenno	3 00
Third, C. M. Handley	1 00
Fletcher Russet :	
First, George V. Fletcher	3 00
Second, Charles F. Curtis	2 00
Hubbardston :	
First, Amos T. Leavitt	3 00
Second, C. L. Hartshorn	2 00
Third, Samuel Hartwell	1 00
Hunt Russet :	
First, E. M. Bruce	3 00
Second, S. Hartwell	2 00
Third, Rev. C. Terry	1 00
Lady's Sweet :	
First, C. C. Shaw	3 00
Northern Spy :	
First, C. L. Hartshorn	3 00
Second, George V. Fletcher	2 00
Third, John L. Bird	1 00
Rhode Island Greening :	
First, Mrs. E. Emmons	3 00
Second, Warren Fenno	2 00
Third, William C. Clapp	1 00
Roxbury Russet :	
First, H. R. Kinney	3 00
Second, Mrs. E. J. Cutter	2 00
Third, Mrs. Mary T. Goddard	1 00

Tolman's Sweet:
First, Mrs. A. E. Underwood 3 00
Second, W. P. Plimpton 2 00
Third, C. C. Shaw 1 00
Tompkins King:
First, George C. Rice 3 00
Second, Samuel Hartwell 2 00
Third, C. L. Hartshorn 1 00
Any other variety:
First, C. C. Shaw, Bellflower 3 00
Second, F. J. Kinney, Mackintosh 2 00
Third, George V. Fletcher, Pound Sweet 1 00
Pears. — Angouleme:
First, F. W. Damon 4 00
Second, A. T. Brown 3 00
Third, Mrs. E. Emmons 2 00
Fourth, F. J. Ward 1 00
Anjou:
First, Mrs. S. Klaus 4 00
Second, A. T. Brown 3 00
Third, William Milman 2 00
Fourth, Clifford R. Weld 1 00
Clairgeau:
First, Charles F. Curtis 3 00
Second, Warren Fenno 2 00
Third, F. W. Damon 1 00
Comice:
First, A. T. Brown 4 00
Second, Mrs. E. Emmons 3 00
Third, Warren Fenno 2 00
Fourth, John L. Bird 1 00
Dana's Hovey:
First, A. T. Brown 4 00
Second, Charles E. Swain 3 00
Third, J. L. Bird 2 00
Fourth, F. W. Damon 1 00
Diel:
First, Charles E. Swain 3 00
Second, Mrs. E. Emmons 2 00
Third, A. T. Brown 1 00
Glout Morceau:
First, Clifford R. Weld 3 00
Josephine of Malines:
First, Warren Fenno 3 00
Second, J. L. Bird 2 00
Third, Francis Blake 1 00

Langelier:	
First, Clifford R. Weld	3 00
Second, Mrs. S. Klaus	2 00
Third, A. T. Brown	1 00
Lawrence:	
First, L. M. Chase	3 00
Second, W. S. Janvrin	2 00
Third, Mrs. E. Emmons	1 00
Vicar:	
First, Mrs. Jones	3 00
Second, E. S. Converse	2 00
Winter Nelis:	
First, A. T. Brown	3 00
Second, Clifford R. Weld	2 00
Third, Mrs. E. Emmons	1 00
Any other variety:	
First, William Milman, Mount Vernon	3 00
Second, A. T. Brown, Sheldon	2 00
Third, Charles E. Swain, Bosc	1 00
Foreign Grapes. — Two bunches of any variety:	
First, William C. Winter, Gros Colman	5 00
Second, Benjamin G. Smith, Muscat of Alexandria	4 00
Third, E. S. Converse, Alicante	3 00

Gratuities: —

Willard Howard, Cranberries	3 00
L. J. Fosdick, "	2 00
Rev. C. Terry, "	1 00
James L. Duncan, Quinces	1 00

E. W. Wood,
Charles F. Curtis,
O. B. Hadwen,
Warren Fenno,
Samuel Hartwell,
J. Willard Hill,
Sumner Coolidge,
Committee on Fruits.

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1898.

By CHARLES N. BRACKETT, Chairman.

Unusual weather conditions prevailed the past season, which was remarkable for its extremes of both heat and moisture. These conditions, while favorable to some classes of vegetables, in others, such as the squash and tomato, for instance, caused a rank and over-luxuriant growth of vines at the expense of the crop. On the whole, however, the exhibits throughout the year have been exceedingly satisfactory, and the number of contributors has increased. Prize exhibitions in this department commenced January 9, at which time there was a very fine show of forced vegetables in great variety, and again, on February 5, was an equally good exhibition with close competition for the prizes on both occasions.

At each Saturday following, up to the Spring Exhibition, liberal displays were made, the principal exhibitors being George D. Moore, Warren Heustis & Son, Arthur F. Coolidge, and James Comley.

The Spring Show, March 22 to 25, was excellent, and the same remark applies to the Rhododendron Show, June 7 and 8. At both of these exhibitions interesting displays of seasonable, well-grown vegetables were made, which were very creditable to the exhibitors. At the Spring Exhibition some excellent specimens of Mushrooms were shown by H. R. Kinney, A. W. Crockford, and I. E. Coburn, which were worthy of special mention; also Tomatoes, by W. C. Winter and Francis Blake.

The prizes for vegetables at the Rose and Strawberry Show, June 23 and 24, called forth a sharp competition from a large number of cultivators. George D. Moore was the largest contributor at this show and carried off a majority of first prizes. The quality and variety of his exhibits furnished ample evidence of his skill as a grower of fine vegetables. All the prizes scheduled were competed for and taken, and altogether this exhibition proved very satisfactory.

As the season advanced there was a corresponding improvement in quantity, quality, and variety of the objects offered in competition. Asparagus was late in making its appearance, and was not shown in the usual quantity. The first exhibit was made May 21, by William H. Hunt. The first Peas of the season were shown June 18, by Norris J. Comley. Tomatoes of open culture made their appearance for the first time July 9, C. L. Hartshorn and W. N. Craig being the exhibitors. The first prize award for Potatoes was made July 16, C. L. Hartshorn receiving the first prize. Sweet Corn was also shown for the first time at this exhibition, by Joshua C. Stone and Sumner Coolidge.

One of the largest and best shows of the season previous to the Annual was made at the closing of the weekly exhibitions, September 10. All the scheduled prizes were competed for and awarded. This show is always looked forward to as one of the most interesting of the season, and the present one fully sustained that reputation. The largest contributors were C. L. Hartshorn, H. R. Kinney, E. C. Lewis, and Warren Heustis & Son.

There has been no lack of enthusiasm manifested the past year by the exhibitors of Native Mushrooms during their season, and their exhibits have attracted crowds of interested visitors on each and every occasion.

After all that has been said about the large quantity of valuable food that is going to waste in the shape of edible Mushrooms, recent investigations made by Prof. L. B. Mendel, of Yale University, show that the nutritive value of the Mushroom is not so very high. "Science" describes Professor Mendel's experiment as follows: "Chemical analyses were combined with experiments in artificial digestion, and special attention was given to the amount of available (digestible) proteid present. The latter was found to be

not over two or three per cent in Mushrooms, which shows that the prevailing idea of the great nutritive value of Mushrooms is not yet justified. They may be valuable as dietetic accessories, but they do not deserve the term 'vegetable beefsteak.' Their nitrogen is largely in the form of non-proteid bodies. The amount of fat, cholesterin, soluble carbo-hydrates, crude fibre, and inorganic substances contained in them corresponds in general with that found in other vegetable foods, such as corn, peas, and potatoes."

The Annual Exhibition, all things considered, was undoubtedly one of the best we have ever made. The tables in the lower hall were fairly well filled. The show of Potatoes was not quite up in quantity to that of some former occasions, but the quality was excellent. F. J. Kinney took the first prize for the best four varieties. His specimens indicated careful culture on the part of the exhibitor, and attracted the attention of the visiting public by their uniformity and smoothness of growth.

The Schedule of Prizes for 1899 remains practically the same as that of the present year, very few changes having been made.

The amount appropriated for the year 1898 was . . .	$1,200
Awards of prizes and gratuities have been made to the amount of	1,148
Leaving an unexpended balance of	$52

All of which is respectfully submitted.

For the Committee,

C. N. Brackett,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1898.

January 8.

Radishes. — Four bunches of any variety:

First, Arthur F. Coolidge	$3 00

Celery. — Four roots:

First, Warren Heustis & Son, Boston Market	3 00
Second, Warren Heustis & Son, Pascal	2 00
Third, H. R. Kinney	1 00

Lettuce. — Four heads of Tennisball:

First, George D. Moore	3 00
Second, George D. Moore, Rawson's Curly	2 00
Third, H. R. Kinney	1 00

Parsley. — Two quarts:

First, W. N. Craig	2 00
Second, H. R. Kinney	1 00

Mushrooms. — Twenty-four specimens:

First, H. R. Kinney	3 00
Second, E. S. Converse	2 00

Tomatoes. — Twelve specimens:

First, William C. Winter, Chemin	3 00
Second, William C. Winter, May's Favorite	2 00
Third, William C. Winter, Stone	1 00

Gratuities: —

Mrs. A. W. Blake, Collection	2 00
Warren Heustis & Son, "	1 00

January 30.

Gratuities: —

Norris J. Comley, Radishes	1 00
Charles H. Hovey, South Pasadena, Cal., Tomatoes	1 00
Arthur F. Coolidge, Collection	2 00

February 5.

Radishes. — Four bunches of any variety:

First, Joshua C. Stone	2 00
Second, Arthur F. Coolidge	1 00

Salsify. — Twelve specimens:

First, H. R. Kinney	3 00
Second, Warren Heustis & Son	2 00
Third, Mrs. A. W. Blake	1 00

Cucumbers. — Pair of any variety:

First, E. M. Bruce	3 00
Second, Francis Blake	2 00

CELERY. — Four roots:

First, E. M. Bruce, Boston Market	3 00
Second, Warren Heustis & Son	2 00
Third, E. M. Bruce, New Queen	1 00

LETTUCE. — Four heads of Tennisball:

First, Joshua C. Stone	3 00
Second, H. R. Kinney	2 00
Third, George D. Moore	1 00

MUSHROOMS. — Twenty-four specimens:

First, H. R. Kinney	3 00
Second, Francis Blake	2 00

RHUBARB. — Twelve stalks:

First, George D. Moore	3 00
Second, Charles F. Smith	2 00
Third, Mrs. A. W. Blake	1 00

TOMATOES. — Twelve specimens:

First, William C. Winter, Stone	3 00
Second, William C. Winter, May's Favorite	2 00
Third, William C. Winter, Chemin	1 00

Gratuities: —

Mrs. A. W. Blake, Collection	1 00
Warren Heustis & Son, "	1 00

FEBRUARY 12.

Gratuities: —

George D. Moore, Lettuce	1 00
Warren Heustis & Son, Celery	1 00

FEBRUARY 19.

Gratuities: —

Warren Heustis & Son, Celery	1 00
James Comley, Rhubarb	1 00

FEBRUARY 26.

Gratuities: —

Warren Heustis & Son, Celery	1 00
Arthur F. Coolidge, Collection	1 00
George D. Moore, "	1 00

MARCH 12.

Gratuities: —

George D. Moore, Lettuce	1 00
Arthur F. Coolidge, Collection	2 00

MARCH 19.

Gratuity: —

Arthur F. Coolidge, Collection	2 00

SPRING EXHIBITION.

March 22, 23, 24, and 25.

William J. Walker Fund.

Radishes. — Turnip Rooted, four bunches:

First, Arthur F. Coolidge	2 00
Second, H. R. Kinney	1 00

Long Scarlet:

First, H. R. Kinney	2 00
Second, Arthur F. Coolidge	1 00

Cucumbers. — White Spine, pair:

First, E. B. Smith	3 00
Second, E. M. Bruce	2 00

Spinach. — Half-peck:

First, Warren Heustis & Son	2 00
Second, Hon. Aaron Low	1 00

Dandelions. — Peck:

First, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, C. L. Hartshorn	1 00

Lettuce. — Tennisball, four heads:

First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00

Water Cress. — Two quarts:

First, Arthur F. Coolidge	2 00

Parsley. — Two quarts:

First, C. L. Hartshorn	2 00
Second, H. R. Kinney	1 00

Mushrooms. — Twenty-four specimens:

First, H. R. Kinney	3 00
Second, A. W. Crockford	2 00
Third, I. E. Coburn	1 00

Rhubarb. — Twelve stalks:

First, George D. Moore	3 00

Tomatoes. — Twelve specimens:

First, Francis Blake	3 00
Second, William C. Winter, Stone	2 00
Third, William C. Winter, Chemin	1 00

Gratuities: —

Hon. Aaron Low, Potatoes	3 00
A. W. Crockford, String Beans	1 00
Benjamin P. Ware, Brussels Sprouts	1 00
M. W. Chadbourne, Artichokes	1 00
Warren Heustis & Son, Collection	2 00

April 2.

Parsnips. — Twelve specimens:
First, Warren Heustis & Son 3 00
Cucumbers. — White Spine, pair:
First, E. B. Smith 3 00
Second, E. M. Bruce 2 00

Gratuities: —
E. M. Bruce, Celery, Queen 1 00
Rev. Calvin Terry, Squashes 1 00
Arthur F. Coolidge, Collection 2 00
Mrs. A. W. Blake, " 1 00
Hon. Aaron Low, " 1 00

April 9.

Gratuity: —
James Comley, Mushrooms 1 00

April 16.

Gratuities: —
George D. Moore, Lettuce 1 00
Warren Heustis & Son, Dandelions 1 00

April 23.

Gratuity: —
Warren Heustis & Son, Lettuce 1 00

April 30.

Gratuities: —
Mrs. E. M. Gill, Tomatoes 1 00
Warren Heustis & Son, Dandelions 1 00
Arthur F. Coolidge, Collection 1 00
George D. Moore, " 1 00

MAY EXHIBITION.

May 7.

William J. Walker Fund.

Cucumbers. — White Spine, pair:
First, Francis Blake 3 00
Second, Arthur F. Coolidge 2 00
Third, George D. Moore 1 00
Spinach. — Peck:
First, Hon. Aaron Low 3 00
Dandelions. — Peck:
First, Warren Heustis & Son 2 00
Second, Arthur F. Coolidge 1 00

LETTUCE. — Four heads:

First, W. N. Craig	3 00
Second, C. L. Hartshorn	2 00
Third, Warren Heustis & Son	1 00

RHUBARB. — Twelve stalks:

First, Warren Heustis & Son	2 00
Second, Hon. Aaron Low	1 00

TOMATOES. — Twelve specimens:

First, Francis Blake, Best of All	3 00
Second, William Nicholson, Frogmore	2 00
Third, Francis Blake, Eclipse	1 00

Gratuities: —

Francis Blake, Tomatoes	1 00
Mrs. E. M. Gill, "	1 00
William Nicholson, Tomatoes	1 00
Arthur F. Coolidge, Beets and Cucumbers	1 00
W. N. Craig, Collection	3 00
Warren Heustis & Son, Collection	1 00

MAY 14.

Gratuity: —

Warren Heustis & Son, Collection	1 00

MAY 21.

Gratuities: —

W. H. Hunt, Asparagus	1 00
Norris F. Comley, Cucumbers	1 00
Warren Heustis & Son, Lettuce	1 00
Mrs. E. M. Gill, Tomatoes	1 00
William Christie, Cauliflowers	1 00

MAY 28.

Gratuities: —

Warren Heustis & Son, Collection	1 00
George D. Moore, "	1 00

JUNE 4.

Gratuities: —

George D. Moore, Collection	2 00
Warren Heustis & Son, "	1 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (POSTPONED FROM JUNE 2 AND 3).

Theodore Lyman Fund.

BEETS. — Twelve specimens, any variety:

First, C. L. Hartshorn	3 00
Second, Warren Heustis & Son	2 00

CARROTS. — Short Scarlet, twelve:
First, W. N. Craig, Sutton's Early 3 00
Second, W. N. Craig, Early Horn 2 00
RADISHES. — Turnip Rooted, four bunches:
First, Warren Heustis & Son 2 00
Second, George D. Moore 1 00
Long Scarlet:
First, George D. Moore 2 00
ASPARAGUS. — Four bunches, twelve stalks each:
First, W. H. Hunt 3 00
Second, C. L. Hartshorn 2 00
CUCUMBERS. — Pair:
First, George D. Moore, White Spine 3 00
Second, C. L. Hartshorn 2 00
Third, George D. Moore, Eureka 1 00
LETTUCE. — Four heads:
First, George D. Moore 3 00
Second, C. L. Hartshorn 2 00
RHUBARB. — Twelve stalks:
First, Warren Heustis & Son 3 00
Second, George D. Moore 2 00
Third, Hon. Aaron Low 1 00

Gratuities: —
William C. Winter, Tomatoes 1 00
Mrs. A. W. Blake, Rhubarb 1 00
James Comley, " 1 00
Warren Heustis & Son, Collection 2 00
George D. Moore, " 2 00
W. N. Craig, " 2 00

JUNE 11.

Gratuities: —
W. H. Hunt, Asparagus 1 00
Miss H. M. Noyes, Mushrooms 1 00

JUNE 18.

Gratuities: —
Estate of Joseph S. Fay, Lettuce 2 00
Warren Heustis & Son, " 1 00
W. H. Hunt, Asparagus 1 00
Norris F. Comley, Peas 1 00
Mrs. E. M. Gill, Tomatoes 1 00
William Doran & Son, Collection 2 00
W. N. Craig, " 1 00
George D. Moore, " 1 00

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

Beets. — Summer Turnip Rooted, twelve:

First, C. L. Hartshorn	3 00
Second, Warren Heustis & Son	2 00
Third, Joshua C. Stone	1 00

Onions. — Twelve specimens:

First, George D. Moore	3 00
Second, C. L. Hartshorn	2 00
Third, Warren Henstis & Son	1 00

Cucumbers. — White Spine, pair:

First, George D. Moore	3 00
Second, Arthur F. Coolidge	2 00
Third, Joshua C. Stone	1 00

Any other variety:

First, W. N. Craig	3 00
Second, George D. Moore	2 00

Cabbages. — Three of any variety, trimmed:

First, George D. Moore	3 00
Third, C. L. Hartshorn	1 00

Lettuce. — Tennisball, four heads:

First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, Joseph Thorp	1 00

Any other variety:

First, Warren Heustis & Son	2 00
Second, George D. Moore	1 00

Peas. — Half-peck of any variety:

First, George D. Moore, Prosperity	3 00
Second, C. L. Hartshorn "	2 00
Third, Arthur Warburton "	1 00

Gratuities: —

William Christie, Carrots	1 00
George D. Moore, Collection	3 00
W. N. Craig, "	2 00
Norris F. Comley, "	1 00
Warren Heustis & Son, "	1 00

July 2.

Onions. — Twelve specimens:

First, George D. Moore	2 00
Second, C. L. Hartshorn	1 00

Squashes. — Long Warted, four:

First, C. L. Hartshorn	2 00
Second, Joshua C. Stone	1 00

Scalloped:
First, Joshua C. Stone 2 00
CABBAGES. — Three of any variety, trimmed:
First, George D. Moore, Early Spring 3 00
Second, George D. Moore, All Head 2 00
Third, C. L. Hartshorn 1 00
PEAS. — American Wonder, half-peck:
First, E. C. Lewis 3 00
Second, C. L. Hartshorn 2 00
Advancer:
First, C. L. Hartshorn 3 00
Any other variety:
First, George D. Moore, Prosperity 3 00
Second, C. L. Hartshorn, " 2 00
Third, E. C. Lewis, Nott's Excelsior 1 00

Gratuities: —
Mrs. E. M. Gill, Tomatoes 1 00
George D. Moore, Collection 2 00
E. C. Lewis, " 1 00
Warren Heustis & Son, " 1 00

JULY 9.

Levi Whitcomb Fund.

CABBAGES. — Three Drumhead, trimmed:
First, George D. Moore 3 00
Second, C. L. Hartshorn 2 00
BEANS. — Cranberry, half-peck:
First, Joshua C. Stone 3 00
Second, Samuel Hartwell 2 00
TOMATOES. — Open culture, twelve specimens:
First, C. L. Hartshorn 3 00
Second, W. N. Craig 2 00

Gratuities: —
Hon. Aaron Low, Potatoes 1 00
Warren Heustis & Son, Collection 1 00
W. N. Craig, " 1 00

JULY 16.

POTATOES. — Twelve specimens:
First, C. L. Hartshorn 3 00
Second, Francis Blake 2 00
Third, Hon. Aaron Low 1 00
LETTUCE. — Tennisball, four heads:
First, Warren Heustis & Son 2 00
Second, George D. Moore 1 00

Any other variety:
First, C. L. Hartshorn 2 00
PEAS. — Stratagem, half-peck:
First, I. E. Coburn 3 00
Second, C. L. Hartshorn 2 00
Any other variety:
First, E. C. Lewis, Carter's Daisy 3 00
Second, E. C. Lewis, Perfection 2 00
Third, I. E. Coburn, Queen 1 00
SWEET CORN. — Twelve ears:
First, Joshua C. Stone 3 00
Second, Sumner Coolidge 2 00
TOMATOES. — Open culture, twelve specimens:
First, C. L. Hartshorn, Acme 3 00
Second, Mrs. E. M. Gill, Stone 2 00
Third, Mrs. A. W. Blake 1 00

Gratuities: —
Hon. Aaron Low, Potatoes 1 00
Warren Heustis & Son, Collection 2 00
George D. Moore, " 2 00
W. N. Craig, " 1 00

JULY 23.

POTATOES. — Any variety, twelve specimens:
First, Francis Blake 3 00
Second, C. C. Marble 2 00
Third, Hon. Aaron Low 1 00
SWEET CORN. — Crosby, twelve ears:
First, Joshua C. Stone 3 00
Second, Samuel Hartwell 2 00
TOMATOES. — Twelve specimens:
First, Mrs. A. W. Blake 3 00
NATIVE MUSHROOMS. — Named collection of not less than five edible varieties:
First, Miss Ellen W. Rumrill 4 00
Second, Aldersey Clark 3 00
Third, Miss Alice L. Grinnell 2 00

Gratuities: —
George B. Gill, Golden Wax Beans 1 00
E. C. Lewis, Collection 2 00
Hon. Aaron Low, " 1 00
George Pfeiffer, " 1 00
Warren Heustis & Son, Collection 1 00

JULY 30.

BEANS. — Goddard, two quarts, shelled:

First, Warren Heustis & Son	3 00

Horticultural, two quarts, shelled:

First, Joshua C. Stone	3 00

TOMATOES. — Comrade, twelve specimens:

First, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00

Stone:

First, Arthur F. Coolidge	3 00
Second, Mrs. E. M. Gill	2 00

Any other variety:

First, C. L. Hartshorn, Acme	3 00
Second, Arthur F. Coolidge, Puritan	2 00
Third, Joshua C. Stone, Atlantic	1 00

EGG PLANTS. — Round Purple, four specimens:

First, H. R. Kinney	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00

Gratuities: —

Warren Heustis & Son, Collection	2 00
E. C. Lewis, "	2 00
Arthur F. Coolidge, "	1 00
Hon. Aaron Low, "	1 00

AUGUST 6.

GREEN-FLESH MELONS. — Four specimens:

First, C. L. Hartshorn	3 00

SWEET CORN. — Twelve ears:

First, Sumner Coolidge	3 00
Second, Joshua C. Stone, Hybrid	2 00
Third, Joshua C. Stone, Crosby	1 00

EGG PLANTS. — Round Purple, four specimens:

First, Joshua C. Stone	2 00
Second, Sumner Coolidge	1 00

Gratuities: —

Samuel Hartwell, Sweet Corn	1 00
Hon. Aaron Low, Peas and Potatoes	1 00
G. S. Gray, Mushrooms	1 00
Warren Heustis & Son, Collection	1 00

AUGUST 13.

POTATOES. — Any variety, twelve specimens:

First, C. L. Hartshorn	3 00
Second, C. C. Marble	2 00
Third, Hon. Aaron Low	1 00

Onions. — Twelve specimens:

First, W. N. Craig, Danvers	3 00
Second, George D. Moore	2 00
Third, W. N. Craig, Weathersfield	1 00

Green-flesh Melons. — Four specimens:

First, Arthur F. Coolidge	3 00

Salmon Flesh Melons. — Any variety, four specimens:

First, Varnum Frost	3 00

Celery. — Four roots of any variety:

First, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
Third, Frederick Tetlow	1 00

Beans. — Large Lima, two quarts:

First, Warren Heustis & Son	3 00

Goddard, Two quarts, shelled:

First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn	2 00
Third, Rev. Calvin Terry	1 00

Sweet Corn. — Potter's Excelsior, twelve ears:

First, Warren Heustis & Son	3 00
Second, Sumner Coolidge	2 00
Third, Hon. Aaron Low	1 00

Any other variety:

First, Samuel Hartwell	3 00
Second, Joshua C. Stone	2 00
Third, C. L. Hartshorn	1 00

Peppers. — Squash, twelve specimens:

First, George Lincoln	3 00
Second, Arthur F. Coolidge	2 00
Third, Hon. Aaron Low	1 00

Any other variety:

First, C. L. Hartshorn	3 00
Second, Joseph Thorp	2 00

Gratuities: —

Warren Heustis & Son, Collection	2 00
W. N. Craig, "	2 00
E. C. Lewis, "	2 00
Arthur F. Coolidge, "	2 00
Hon. Aaron Low, "	1 00

August 20.

Green-flesh Melons. — Four specimens:

First, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00

Salmon-flesh Melons. — Four specimens:

First, Varnum Frost	3 00

WATERMELONS. — Pair:
First, E. C. Lewis 3 00
CABBAGES. — Three of any variety, trimmed:
First, C. L. Hartshorn 3 00
Second, Warren Heustis & Son, Succession 2 00
Third, Warren Heustis & Son, All Seasons 1 00
CELERY. — Four roots:
First, Arthur F. Coolidge 3 00
Second, Warren Heustis & Son 2 00
BEANS. — Large Lima, two quarts:
First, C. L. Hartshorn 3 00
Second, Warren Heustis & Son 2 00
Dwarf Lima:
First, Warren Heustis & Son 3 00
Second, C. L. Hartshorn 2 00
MARTYNIAS. — Twelve specimens:
First, E. C. Lewis 2 00
Second, E. S. Converse 1 00
NATIVE MUSHROOMS. — Named collection, of not less than five edible varieties:
First, G. A. Clark 3 00
Second, Miss Ellen W. Rumrill 2 00

Gratuities: —
W. N. Craig, Collection of Tomatoes 2 00
Arthur F. Coolidge, Collection 2 00
I. E. Coburn, " 1 00
Hon. Aaron Low, " 1 00

AUGUST 27.

Gratuities: —
Warren Heustis & Son, Celery 1 00
C. E. Richardson, Cucumbers 1 00

SEPTEMBER 3.

Gratuity: —
Warren Heustis & Son, Celery 1 00

SEPTEMBER 10.

TURNIPS. — Twelve Flat:
First, E. C. Lewis 3 00
Second, F. J. Kinney 2 00
Third, C. L. Hartshorn 1 00
GREEN-FLESH MELONS. — Four specimens:
First, E. C. Lewis 3 00
Second, Arthur F. Coolidge 2 00
Third, I. E. Coburn 1 00

SALMON-FLESH MELONS. — Four specimens:

First, Hon. Aaron Low	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00

WATERMELONS. — Two specimens:

First, E. C. Lewis	3 00
Second, E. C. Lewis	2 00
Third, Hon. Aaron Low	1 00

CAULIFLOWERS. — Four specimens:

First, De Souza Brothers	3 00

LETTUCE. — Any variety, four heads:

First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn	2 00
Third, Sumner Coolidge	1 00

CELERY. — Any variety, four roots:

First, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, C. L. Hartshorn	1 00

PARSLEY. — Two quarts:

First, C. L. Hartshorn	2 00
Second, W. N. Craig	1 00

BEANS. — Large Lima, two quarts:

First, C. L. Hartshorn	3 00
Second, William Christie	2 00
Third, Mrs. E. M. Gill	1 00

CORN. — Sweet, Potter's Excelsior, twelve ears:

First, E. C. Lewis	3 00
Second, O. R. Robbins	2 00
Third, Joshua C. Stone	1 00

Any other sweet variety:

First, O. R. Robbins	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00

EGG PLANTS. — Round purple, four specimens:

First, C. L. Hartshorn	3 00
Second, H. R. Kinney	2 00
Third, Arthur F. Coolidge	1 00

TOMATOES. — Three varieties, twelve specimens each:

First, I. E. Coburn	5 00
Second, Arthur F. Coolidge	4 00
Third, Mrs. A. W. Blake	3 00

Aristocrat, twelve:

First, Varnum Frost	3 00
Second, Hon. Aaron Low	2 00
Third, Arthur F. Coolidge	1 00

Comrade:

First, Varnum Frost	3 00

Second, Francis Blake	2 00
Third, Hon. Aaron Low	1 00
May's Favorite:	
First, Varnum Frost	3 00
Second, Francis Blake	2 00
Third, Mrs. A. W. Blake	1 00
Any other variety:	
First, Varnum Frost, Stone	3 00
Second, Francis Blake	2 00
Third, H. R. Kinney	1 00
MARTYNIAS. — Twelve specimens:	
First, E. C. Lewis	2 00
Second, Hon. Aaron Low	1 00
OKRA. — Twelve specimens:	
First, E. C. Lewis	2 00
Second, E. C. Lewis	1 00
PEPPERS. — Squash, twelve specimens:	
First, Hon. Aaron Low	2 00
Second, Arthur F. Coolidge	1 00
Any other variety:	
First, E. C. Lewis	2 00
Second, C. L. Hartshorn	1 00
Gratuities: —	
E. C. Lewis, Collection of Melons	2 00
Arthur F. Coolidge, Collection	2 00
W. N. Craig, "	2 00
Hon. Aaron Low, "	2 00
George D. Moore, "	1 00
Warren Heustis & Son, "	1 00

SEPTEMBER 17.

Gratuities: —	
Warren Heustis & Son, Celery	1 00
James Comley, Tomatoes	1 00
Hon. Aaron Low, Melons	1 00

SEPTEMBER 24.

Gratuities: —	
Warren Heustis & Son, Lettuce	1 00
Hon. Aaron Low, Melons	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

BEETS. — Turnip Rooted, twelve:	
First, Varnum Frost	3 00
Second, Joshua C. Stone	2 00
Third, C. L. Hartshorn	1 00

CARROTS. — Long Orange, twelve:

First, H. R. Kinney	3 00
Second, Walter Warburton	2 00
Third, E. C. Lewis	1 00

Intermediate:

First, H. R. Kinney	3 00
Second, Varnum Frost	2 00
Third, Walter Warburton	1 00

PARSNIPS. — Long, twelve:

First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Varnum Frost	1 00

POTATOES. — Four varieties, twelve specimens each:

First, F. J. Kinney	5 00
Second, Mrs. Mary T. Goddard	4 00
Third, E. C. Lewis	3 00

Carman No. 1:

First, Mrs. Mary T. Goddard	3 00
Second, Hon. Aaron Low	2 00

Clark:

First, F. J. Kinney	3 00
Second, Hon. Aaron Low	2 00
Third, Mrs. Mary T. Goddard	1 00

Hebron:

First, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
Third, C. L. Hartshorn	1 00

Rose:

First, H. R. Kinney	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, B. J. De Souza	1 00

Any other variety:

First, F. J. Kinney, Somerset	3 00
Second, Arthur Nixon	2 00
Third, Mrs. Mary T. Goddard	1 00

SALSIFY. — Twelve specimens:

First, Warren Heustis & Son	3 00
Second, E. C. Lewis, Sandwich Island	2 00
Third, E. C. Lewis, Breck's Improved	1 00

TURNIPS. — Flat, twelve:

First, F. J. Kinney	3 00
Second, George F. Wheeler	2 00
Third, E. C. Lewis	1 00

Swedish:

First, C. L. Hartshorn	3 00
Second, F. J. Kinney	2 00
Third, E. C. Lewis	1 00

ONIONS. — Danvers, twelve:

First, Charles F. Curtis	3 00
Second, W. N. Craig, Globe	2 00
Third, W. N. Craig, Flat Danvers	1 00

Red:

First, W. N. Craig	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, C. L. Hartshorn	1 00

White:

First, W. N. Craig	2 00
Second, E. C. Lewis	1 00

Any other variety:

First, W. N. Craig, Ailsa Craig	3 00
Second, W. N. Craig, Prize Taker	2 00
Third, Mrs. Mary T. Goddard, Prize Taker	1 00

SQUASHES. — Bay State, three:

First, Hon. Aaron Low	3 00
Second, Sumner Coolidge	2 00
Third, E. C. Lewis	1 00

Hubbard:

First, Varnum Frost	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00

Hybrid Turban:

First, E. C. Lewis	3 00

Marblehead:

First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Third, Mrs. Mary T. Goddard	1 00

Marrow:

First, Varnum Frost	3 00
Second, C. L. Hartshorn	2 00
Third, Arthur F. Coolidge	1 00

Any other variety:

First, C. L. Hartshorn, Warren	3 00
Second, Hon. Aaron Low	2 00
Third, Hon. Aaron Low, Plymouth Rock	1 00

CUCUMBERS. — White Spine, pair:

First, E. M. Bruce	3 00
Second, William Doran & Son	2 00

Any other variety:

First, Daniel T. Curtis	3 00
Second, Hon. Aaron Low	2 00

MELONS, GREEN-FLESH OR SALMON-FLESH. — Four specimens:

First, Hon. Aaron Low, Emerald Green	3 00
Second, E. C. Lewis	2 00
Third, Hon. Aaron Low, Christiana	1 00

WATERMELONS. — Two specimens:

First, E. C. Lewis	3 00
Second, Hon. Aaron Low	2 00
Third, E. C. Lewis	1 00

BRUSSELS SPROUTS. — Half-peck:

First, C. L. Hartshorn	3 00

CABBAGES. — Drumhead, three:

First, Mrs. Mary T. Goddard	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00

Red:

First, Mrs. Mary T. Goddard	3 00

Savoy:

First, Mrs. Mary T. Goddard	3 00
Second, E. C. Lewis	2 00
Third, Joshua C. Stone	1 00

CAULIFLOWERS. — Four specimens:

First, B. J. De Souza	5 00
Second, Samuel Hartwell	4 00
Third, C. M. Handley	3 00

CELERY. — Paris Golden, four roots, best kept during the exhibition:

First, Warren Heustis & Son	5 00
Second, C. L. Hartshorn	4 00
Third, Arthur F. Coolidge	3 00

Any other variety:

First, E. M. Bruce, Pearl	5 00
Second, Warren Heustis & Son, Pascal	4 00
Third, C. L. Hartshorn, Pascal	3 00

ENDIVE. — Four specimens:

First, H. R. Kinney	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00

LETTUCE. — Four heads:

First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, Sumner Coolidge	1 00

PARSLEY. — Two quarts:

First, W. N. Craig	2 00
Second, C. L. Hartshorn	1 00

HORSE-RADISH. — Six roots, present year's growth:

First, H. R. Kinney	2 00

CORN. — Yellow, or Field, twenty-five ears, traced:

First, Elliott Moore, eight rowed	3 00
Second, Elliott Moore, twelve rowed	2 00

Sweet, twelve ears:

First, O. R. Robbins	3 00
Second, Arthur F. Coolidge	2 00
Third, E. C. Lewis	1 00

EGG PLANTS. — Round Purple, four:

First, C. L. Hartshorn	3 00
Second, Arthur F. Coolidge	2 00
Third, Sumner Coolidge	1 00

TOMATOES. — Three varieties, twelve specimens each:

First, Arthur F. Coolidge	5 00
Second, H. R. Kinney	4 00
Third, Francis Blake	3 00

Aristocrat:

First, Varnum Frost	3 00
Second, Arthur F. Coolidge	2 00
Third, Hon. Aaron Low	1 00

May's Favorite:

First, E. M. Bruce	3 00
Second, Hon. Aaron Low	2 00
Third, Francis Blake	1 00

Stone:

First, H. R. Kinney	3 00
Second, Thomas Appleford	2 00
Third, Arthur F. Coolidge	1 00

Any other variety:

First, James Comley, New Champion	3 00
Second, A. T. Brown, Buckeye	2 00
Third, Arthur F. Coolidge, Comrade	1 00

PEPPERS. — Squash, twelve specimens:

First, George Lincoln	3 00
Second, Hon. Aaron Low	2 00
Third, C. L. Hartshorn	1 00

Any other variety:

First, C. L. Hartshorn, Ruby King	3 00
Second, Hon. Aaron Low, "	2 00
Third, E. C. Lewis, "	1 00

CULINARY HERBS. — Collection, named:

First, W. N. Craig (green)	5 00
Second, C. L. Hartshorn (dried)	4 00

NATIVE MUSHROOMS. — Named collection, not less than five edible varieties (postponed from September 10):

First, Hollis Webster	3 00
Second, Miss Ellen W. Rumrill	2 00

Gratuities: —

Hon. Aaron Low, Collection of Potatoes	5 00
V. B. Hersom, Squashes	2 00
George E. Richardson, Gourds	1 00
Thomas Appleford, Collection of Corn	1 00
Mrs. Mary T. Goddard, Lima Beans	2 00
Thomas Appleford, " "	1 00

Mrs. E. M. Gill, Lima Beans	1 00
Warren Heustis & Son, Collection	5 00
W. N. Craig, "	5 00
E. C. Lewis, "	2 00
George D. Moore "	1 00

October 8.

Gratuities : —

George D. Moore, Lettuce and Celery	2 00
Warren Heustis & Son, Celery	1 00

October 15.

Gratuity : —

Warren Heustis & Son, Collection	2 00

October 22.

Gratuities : —

Mrs. E. M. Gill, Lima Beans	1 00
Charles W. Parker, Sweet Potatoes and Peanuts	1 00
George D. Moore, Collection	1 00

October 29.

Gratuity : —

Warren Heustis & Son, Collection	2 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

November 5.

Parsnips. — Twelve specimens :	
First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Arthur Nixon	1 00
Cabbages. — Red, three specimens, trimmed :	
First, C. L. Hartshorn	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, Walter Warburton	1 00
Savoy :	
First, J. C. Stone	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00
Brussels Sprouts. — Half-peck :	
First, E. S. Converse	3 00
Second, C. L. Hartshorn, Improved	2 00
Third, C. L. Hartshorn, Paris Market	1 00
Cauliflowers. — Four specimens :	
First, De Souza Brothers	3 00
Second, C. M. Handley	2 00
Third, E. C. Lewis	1 00

CELERY. — Four roots:

First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00

LETTUCE. — Four heads:

First, Joshua C. Stone	3 00
Second, Warren Heustis & Son	2 00
Third, George D. Moore	1 00

TOMATOES. — Twelve specimens, grown under glass:

First, William C. Winter	3 00
Second, Francis Blake, Best of All	2 00
Third, Francis Blake, Essex	1 00

Gratuities: —

Mrs. Mary T. Goddard, Collections of Potatoes	2 00
Hon. Aaron Low, Collection of Squashes	2 00
L. H. Heustis, Squashes	1 00
James L. Duncan, Crosnes (*Stachys affinis*)	1 00
E. C. Lewis, Collection	4 00
Arthur Nixon, "	3 00
Warren Heustis & Son, Collection	2 00

NOVEMBER 12.

Gratuity: —

Warren Heustis & Son, Celery	1 00

NOVEMBER 19.

Gratuities: —

Hon. Aaron Low, Turnips	1 00
George D. Moore, Lettuce	1 00
George M. Anderson, Mushrooms	1 00

NOVEMBER 26.

Gratuity: —

Warren Heustis & Son, Collection	1 00

DECEMBER 17.

Gratuity: —

Warren Heustis & Son, Celery	1 00

CHARLES N. BRACKETT,
CEPHAS H. BRACKETT,
VARNUM FROST,
WARREN H. HEUSTIS,
P. G. HANSON,
WALTER RUSSELL,
AARON LOW,
Committee on Vegetables.

REPORTS

OF THE

COMMITTEE ON GARDENS,

FOR THE YEARS 1897 AND 1898.

By PATRICK NORTON, Chairman.

REPORT FOR 1897.

[The accounts of the visits to the houses and grounds of Messrs. Nicholson, the Bussey Institution, Mr. Nevins, the Hayes estate, and Mrs. Cheney were prepared by Azell C. Bowditch, who acted as Chairman of the Committee at the time those places were visited.]

The year 1897, just closed, has been one of unusual activity with your Committee, as more calls for visits have been made than during the year just preceding. The applications during the first half of the year were but few, but as the summer advanced they came in so fast that we were quite busy till late into the fall.

We noticed on some of the places visited changes in the mode of planting. Hardy herbaceous and other flowering plants were more freely used than coleuses and other foliage plants, thereby giving more beauty to the landscape than the foliage alone. This, we think, is to be commended.

William Nicholson & Son's Carnation Houses, Framingham.

On March 18 we were invited to visit the carnation houses of William Nicholson and Son at Framingham. The particular house which they entered for the prize for the best carnation house is eighty-seven feet long by twenty-five feet wide. The carnations were in splendid condition, fully flowered, and showed by their

appearance that they received the very best of care and fully responded to it. As this class of plants is a specialty with this firm, all the promising new varieties are tried as soon as procurable, with a view to having the best in cultivation. They have been successful cultivators of the carnation.

While we were looking at the Messrs. Nicholson's carnations our attention was called to a house of tomatoes just coming into fruit. It was the finest house of tomatoes your Committee had ever seen. The Messrs. Nicholson were justly proud of their tomato house, and well they might be, for the financial result was very pleasing after the abundant crop was marketed. It was noticed that all the houses were uncommonly neat for commercial houses.

Bussey Institution of Harvard University, Jamaica Plain.

This was the next place visited, on March 27. Charles Jackson Dawson conducted us through the greenhouses, and explained as we passed along that the object of forcing hardy plants was to determine the length of time it would take to bring them into bloom from the dormant state, and also to have them in readiness for use in the school of botany. The plants were treated in three classes, viz., shrubs, herbaceous plants, and bulbs; and Mr. Dawson's letter in the Transactions of the Society for 1896 fully explains the whole matter.

David Nevins's Estate, South Framingham.

On the 15th of June we again visited this estate, which is entered for the Hunnewell Triennial Prize. As it is fully described in the report of last year, we will not take up time and space in going over the same ground again. We noticed on this visit that extensive improvements had been made, such as the transplanting of a great number of large elms and evergreens, which will in time add very much to the landscape effect.

The Francis B. Hayes Estate, Lexington.

Our next visit was to the Hayes estate in Lexington, on the 16th of June. This estate is in charge of James Comley, who has been superintendent of it from the time when Mr. Hayes came into possession. It received, some years ago, the

first Hunnewell Triennial Prize, but today it is yet more worthy of that prize, as with the lapse of time the beautiful shrubs and trees then planted have gone on towards perfection, and it now presents to the visitor a most charming sight. Mr. Comley has by judicious management and combination planting of shrubs and trees made this place a model of beauty for others to copy.

Mrs. Benjamin P. Cheney's Estate, Wellesley.

On the 2d of July we visited the large estate of Mrs. B. P. Cheney, just south of Wellesley. This estate has been so fully described in former reports of this Committee that it would be needless to repeat what has been said. It is a charming place, containing several hundred acres of land nearly surrounded by the Charles River, with fine driveways through the natural forests in every direction, making a carriage drive on this place much more enjoyable than on any public highway, even in the beautiful town of Wellesley.

Arthur F. Estabrook's Estate, Beach Bluff.

This estate is entered for the Hunnewell Triennial Prize, and this was our first visit. The place is a new one, situated on the corner of Phillips and Atlantic avenues; it is elevated land, and the elegant house overlooks the ocean. The grounds are judiciously planted with trees, shrubs, and flowers, and will in a few years present a charming appearance. We shall visit this place with renewed pleasure in the future, as we are confident it will continue to improve in beauty as the trees, etc., develop towards perfection.

Warren H. Heustis and Son's Vegetable Farm, Belmont.

This place was visited on the 15th of August. It is devoted to the growing of vegetables and fruits, and the raising of pigs. Mr. Heustis is an enthusiastic farmer and successful in his undertakings. On this farm originated the Belmont strawberry, which still holds its own place for size and excellence, equal to that of any other.

George A. Nickerson's Grape House, Dedham.

We were invited to visit this house on the 26th of August. It is

a large curvilinear-roofed house fully one hundred feet long by twenty-five feet wide, and is filled with grapevines. They were in a thrifty condition and in full bearing. The bunches were very even — none extremely large, but well-colored and carrying a fine bloom. The varieties are Black Hamburg, Muscat of Alexandria, Buckland Sweetwater, Bowood Muscat, Golden Hamburg, and others. We congratulate Mr. David Monteith, the gardener, on his success as a grape grower.

Sumner and Frank E. Coolidge's Farm, Mount Auburn.

Our next visit was to the Coolidge Farm, at Mount Auburn. This farm contains about one hundred acres mostly devoted to growing vegetables for the market. There are employed during the summer about one hundred Italians as laborers. Everything pertaining to the carrying on of the place is performed on the premises, and during the busiest seasons of the year seven teams are employed daily to carry the products to market. The proprietors have established a large irrigating plant, which is fed from driven wells, and the water is carried by pipes all over the farm, thereby avoiding drought, and producing good crops in the dryest of seasons. Their enterprise is to be commended.

Col. Frederick Mason's Farm, Taunton.

On the 9th of September your Committee paid a visit to the farm of Col. Frederick Mason, in Taunton, to inspect the vegetable garden which was entered for the prize for the best Vegetable Garden. This garden covers about five acres, and all the vegetables seen in our markets and others often mentioned in books, but seldom seen, were growing in abundance and of very superior quality. Mr. E. C. Lewis, the efficient gardener, said he planted about one hundred kinds of vegetables, and from their appearance he evidently kept them in the highest condition till maturity. This was one of the most enjoyable excursions of the year, as we were brought in contact with the perfection of general gardening on a liberal scale.

Warren D. Hinds's Peach Orchard, Townsend.

On September 17 we visited the peach orchards of W. D. Hinds at Townsend, in the northern part of the State. We found the

trees generally in good condition, with a few exceptions where the yellows seem to have developed. Mr. Hinds told the Committee how reluctant he was to thin out sometimes nearly half the fruit on a tree, but he was learning by experience that large fruit sells itself every time, when if all the fruit is left on it never acquires the fine appearance of that which is left after thinning.

Fred R. Mathieson's Greenhouses, Waltham.

On October 12 we were invited to visit the spacious greenhouses of Fred R. Mathieson at Waltham. These are chiefly devoted to the growing of roses. We found the houses well filled with plants in the finest condition and well bloomed. It is very evident that Mr. Mathieson knows how to grow roses in the best possible manner, and he profits from observation while on visits of inspection far and near to houses devoted to the same flower. We congratulate Mr. Mathieson on the success attending his efforts.

The Lenox Horticultural Society.

The Lenox Horticultural Society having invited the Garden Committee of the Massachusetts Horticultural Society to visit that famous town for a few days of restful pleasure, we departed from Boston on an early train on the thirteenth day of October, and arrived at Pittsfield, which is six miles from Lenox, at about noon. A delegation met us at the railroad station, and we were immediately conducted to a hotel, where an excellent dinner awaited and prepared us for the pleasant duties we had to perform. The prominent estates we were expected to visit comprised some of the most extensive in the State, and instead of the two days we spent inspecting a few of them we should want a month to do the pleasant work to our satisfaction. A four-horse carriage was at our service during the whole time of our stay, and a banquet was given to us in the evening. Though the country round about is hilly it does not present a rugged aspect, but on the contrary these beautiful hills have a charm and beauty all their own, and attract the wealthy from all over the country to recuperate in the health-giving atmosphere of the old Berkshire hills, after having become exhausted by the demands of society in other haunts of pleasure during summer.

Some of the estates comprise thousands of acres, and are laid

out in the most judicious manner with fine roads and walks of great extent, thus making a great private park of fully twenty-five square miles, studded with private residences palatial in character, of remarkable beauty and grandeur. It would seem out of place for us to describe any one estate among so many, and we will therefore confine ourselves to remarks giving a general idea of the scenery and the careful efforts of the gardener and architect in making the place so beautiful. One point which struck the Committee was the very short time in which these beautiful grounds had been developed from ordinary farming lands. Millions of money have been expended in the gradual improvement of this beautiful country, and the present result is a collection of private residences and specimens of landscape gardening that cannot be equalled elsewhere in all New England. A large number of these beautiful places have come into existence in this remarkable town, and a good many more are projected, each new proprietor trying to excel every one else in the generous expenditure of wealth in the building of a country home and the ornamentation of the already beautiful grounds.

Every such place as those above described requires the care of a competent head gardener, as well as a sufficient number of foremen and assistants, and it is probable that nowhere else in this country can an equal number of highly educated and skilful gardeners be found. The Horticultural Society of Lenox is not large in numbers, but this is more than made up by the accomplishments of its members and their expansive hospitality in entertaining their friends, and our visit to Lenox will long be remembered as one of the most delightful that the Garden Committee has ever made. The natural beauty of the place in the autumnal season was indescribable, for all nature had put on its most gorgeous colors to welcome us, which, together with the extreme hospitality of the gardeners, made us wish that our future lives might be cast in such a pleasant place as Lenox, and in such agreeable society as we met with there.

It has been a problem with many of the members of the Massachusetts Horticultural Society, who desire its utmost usefulness, how its influence could be extended so that it should be a State Society in reality as well as in name, and it is hoped that this visit may lead to such an extension of its usefulness.

Edmund M. Wood & Co.'s Greenhouses, Natick.

The twenty-eighth of October found your Committee at Natick, visiting the extensive greenhouses of Edmund M. Wood & Co. One of the houses, one hundred and fifty feet long by twenty feet wide and fourteen feet high, was devoted to the growing of chrysanthemums. There were in this house about four thousand plants, grown to a single stem, in about thirty varieties of the very best kinds in existence. Mr. Montgomery, the gardener, tests all the newly introduced and highly extolled kinds to see whether they are adapted to his wants, and if he finds them of sufficient merit to warrant, he continues to grow them afterwards. By this mode of procedure his house is filled with only the very best and most marketable kinds. He plants them in the same soil that he uses for growing roses, being very particular about drainage, as they require plenty of water continually applied. When they require stimulating, he feeds with commercial fertilizers in such quantities as in his good judgment and experience they need. So we see that there is no fast and loose way of growing anything under glass, but to be successful one must have knowledge and experience.

David Nevins's Chrysanthemum House, South Framingham.

On the twenty-ninth of October we again visited the David Nevins estate, to view his house of chrysanthemums planted on benches. These plants were grown to one flower, and presented a very thrifty appearance. The flowers were very large and well finished, and reflected great credit on the gardener, Alexander McKay, for the care he bestowed while they were growing.

William Nicholson & Son's Chrysanthemum House.

On the same day we again visited William Nicholson & Son's estate, to view a house of chrysanthemums grown on benches. We were highly pleased with the exhibition, for the plants were grown for one to three blooms to a plant, thereby giving more blooms than if all were grown singly. The market value of these medium-sized blooms is nearly as great as that of the giant blooms, and a great many more of them can be sold. The house presented a charming appearance.

Mrs. Benjamin P. Cheney's Chrysanthemums.

On the thirtieth of October we visited Mrs. B. P. Cheney's beautiful home at Wellesley, to see her splendid show of chrysanthemums. Mr. John Barr, the gardener, said he had about eight hundred single-stem plants on benches, comprising fifty varieties, and sixty-five ten-inch pots of specimen plants in thirty varieties. These were all of the very best kinds known, and they were a most beautiful sight to behold. As chrysanthemums vary greatly in the time they come into bloom, it will be well, if one wants a large lot to come into bloom at a given time, to know exactly whether they are early or late bloomers, so that he may plant accordingly.

The Eliot School Children's Chrysanthemum Exhibition, South Natick.

An unusual exhibition of chrysanthemums was made on November 11, 12, and 13 by the children of the Eliot School at South Natick, to which the Garden Committee were invited. In June, 1897, at the instance of T. D. Hatfield, gardener to Walter Hunnewell, one hundred and fifty plants were given to the school children by him and other gardeners to care for, grow, and bloom, and in the fall to bring forward for the exhibition. The prizes were given in Holland bulbs for house culture during the winter. The first prizes were seventeen bulbs each; second prizes, twelve bulbs; and all others six bulbs each. The children wrote their experiences, giving the life history of their plants, including their struggles with insects, mildew, etc. There is no doubt that such experience is valuable to a child, as it has a tendency to inculcate carefulness in horticulture, and foster a taste for the noble art which may be prolonged during the whole life. The practice of school exhibitions is to be heartily commended, and Mr. Hatfield and the teachers deserve much credit for originating this exhibition, at once educational and beautiful.

David Nevins's Violets.

The next visit made was on the second of December, to the David Nevins estate to view frames of violets. These were grown during the summer in rich garden soil near a hedge running north and south, and, in the early fall, transplanted to the frames. They showed no fungous disease, but were pictures of health and

splendidly flowered. Mr. McKay, the gardener, told us that the soil was composed of old sods and decayed leaves and very old manure, which produces a natural, cool soil, just such as the violet likes. He is very successful in their cultivation.

Sumner Coolidge's Violets.

On December 23 we visited the farm of Sumner Coolidge, to consider two houses of violets, one of Marie Louise, and the other Lady Hume Campbell. The plants had been placed in the ground the same as lettuce is planted. They were not in that very vigorous condition in which we like to see violets grown, but they were giving a large quantity of bloom of second quality, which supplied a certain demand. Violets, to produce fine blooms, must be grown luxuriantly, and they will sell on sight and command good prices.

The prizes and gratuities awarded during the year were as follows:

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums arranged for effect with other plants:	
First, Mrs. B. P. Cheney	$50 00

Society's Prizes.

For the best house of Foreign Grapes:	
First, George A. Nickerson	40 00
For the best house of Chrysanthemums grown on benches:	
First, Edmund M. Wood & Co.	50 00
Second, David Nevins	30 00
For the best bench or frames of Violets:	
First, David Nevins	40 00
Second, Sumner Coolidge	20 00
For the best Carnation house:	
First, William Nicholson & Son	40 00
For the best Fruit Garden:	
First, Warren D. Hinds	50 00
For the best Vegetable Garden:	
First, Col. Frederick Mason	50 00
Second, Sumner Coolidge	30 00

Gratuities.

Fred R. Mathieson, for Rose houses	25 00
James Comley, for frames of Russian Violets	20 00
Bussey Institution, for Spring Flowers	20 00
William Nicholson & Son, for house of Tomatoes	20 00
Eliot School, South Natick, for Chrysanthemums in pots	15 00

Amount appropriated		$500 00
Awarded for prizes	$400 00	
Awarded for gratuities	100 00	
		$500 00

Respectfully submitted,

PATRICK NORTON,
AZELL C. BOWDITCH,
J. WOODWARD MANNING,
E. W. WOOD,
CHARLES N. BRACKETT,
JOSEPH H. WOODFORD,
HENRY W. WILSON,
JACKSON DAWSON,

Committee on Gardens.

REPORT FOR 1898.

The year which has just closed has been, like the preceding, one of unusual activity for your Committee, for all the prizes in the Schedule have been competed for, and your Committee have made twenty-one visits to different places to view the results of intelligent horticulture as practised at the various places.

The David Nevins Estate, South Framingham.

In the year 1896 David Nevins, of South Framingham, entered his estate for the Hunnewell Triennial premium. This place has been visited twice a year since, the last visit occurring in November of this year. It consists of some five hundred acres, the greater portion of which is laid down to grass, but the area surrounding the mansion house, comprising about seventy-five acres, is kept in a superb closely shaven lawn interspersed with groups of trees, shrubs, and flower beds. Messrs. Ernest W. and James H. Bowditch were the landscape architects, with the coöperation of Alexander McKay, the permanent and efficient gardener on the place.

The situation of this estate is very beautiful, as it is divided by the Metropolitan Water Works, formerly the Sudbury River, which runs northerly through the middle of it, and joins Farm Pond on the east, thereby making the place a splendid park with grand water views in every direction. The old stone walls and fences have all been removed, the clumps of native forests have all been cleared up, and the driveways all over the five hundred acres are in most perfect order, making this estate one of the most charming and beautiful in the Commonwealth. This estate is awarded the First Hunnewell Triennial prize of $160.

During the past year, while Mr. Nevins was in Europe, where he went with the hope of improving his health, he died, much to the regret of all who knew him. He was a genial and companionable gentleman, and will be greatly missed by his family and by all who knew him, in all stations in life. *Requiescat in pace!*

George D. Moore's Vegetable Farm, Arlington.

We also had the pleasure of visiting the farm of George D. Moore, at Arlington, on April 9 and July 26. This farm is entirely devoted to growing early and late vegetables, and several crops are taken from the same ground every year. Mr. Moore is a successful, hard-working farmer, applying experience and knowledge to accomplish good results in growing crops for market. His crops under glass as well as those outdoors were in fine condition, and deserved the award your Committee has made. We append Mr. Moore's letter explaining his mode of procedure.

Arlington, April 9, 1898.

Patrick Norton, Esq., *Chairman of Garden Committee:*

Dear Sir: In compliance with your request I herewith send you some statistics and explanations of our market-garden operations.

We have some nine hundred hotbed sashes, which we use almost exclusively in raising lettuce, getting two crops in a season. We raise the plants, which take six to eight weeks to grow to the required size in our smallest greenhouse. Our first crop we transplant to the sash in February. We prepare the beds in the usual way in the fall, covering them four or five inches deep with strawy horse manure to keep out the frost. We cover them with the sash and shutters before the heavy snows. When ready to use the beds we take the covering for banking the sides of the hotbeds, then beginning at one end of the bed we shovel out the soil eight or ten inches deep from two sashes and fill in with heat (horse manure) to the depth of seven or eight inches when thoroughly packed or trodden down, then shovel the soil from the next two sashes back on this heat, and so continue to the end of the bed, after which we put the sashes back over the bed, covering at night with mats and shutters. In two or three days the soil will have been warmed by the under heat sufficiently to receive the plants. We then fork over the soil, breaking it fine, after which we rake in thoroughly about two pounds of Stockbridge Lettuce Special Fertilizer to each sash; then we pat down the surface with the back of a snow shovel to break the little lumps on top and keep the surface from drying till the plants cover the ground. We usually sprinkle the surface with tobacco dust, which we think has

a tendency to prevent mildew and ward off the lice pest, so troublesome to hotbed and greenhouse crops.

The management of the glass after planting can only be learned by education and experience. We have three greenhouses, the largest containing fourteen thousand lettuce plants, the next ten thousand, and the smallest about eight thousand, set eight inches apart. We usually raise three crops of lettuce in the houses, setting the first in October and harvesting the last in April, after which the houses are planted to cucumbers. The raising of lettuce in the greenhouse differs little from that in the hotbeds, with the exception of the under heat, which, for lettuce, is not necessary, but for cucumbers we make trenches fifteen inches wide and the same depth, and eight feet apart. In these trenches we put about a foot of well packed or trodden heat (horse manure), then cover with soil, and in a day or two when the soil is well warmed from the under heat we set two plants in hills three feet apart. These plants have been raised in six-inch flower-pots and should be six or eight inches high when transplanted. We usually fertilize the soil with Bowker Vine Fertilizer, say two pounds to eighteen square feet.

As in the management of hotbeds, it requires education and experience to make the business a success. If you desire I will give you a description of our management of the outside farming in a future letter.

Very truly yours,

GEO. D. MOORE.

GEORGE MARSTON WHITIN'S VINERY, WHITINSVILLE.

On August 10 we were invited to visit the vinery of George Marston Whitin, at Whitinsville, in the town of Northbridge, in the southern part of the State. This house is quite spacious, and is divided by a partition in the middle so as to enable the gardener to force one-half the house earlier than the other half, thereby extending the time of ripening. The house presented a grand appearance, the great bunches of grapes hanging in wonderful profusion, well colored, and of fine quality. Mr. George McWilliam, the gardener, deserves great credit for producing year after year such abundant crops of delicious fruit, and without any injury to the vines. A portion of the crop will not be consumed till next spring, the house thus furnishing a most refreshing fruit for eight

or nine months in the year. We have the pleasure of appending hereto Mr. McWilliam's method of growing foreign grapes, which is very instructive and well worth studying.

WHITINSVILLE, Dec. 30, 1898.

Mr. P. NORTON, *Chairman of Garden Committee:*

DEAR SIR: The graperies of G. M. Whitin are two span-roofed houses running east and west and heated with hot water. The vines were planted in May, 1885, with plants raised from eyes put in small pots in February. The young vines reached the top of the house early in July, were cut back to near the ground in December, carried their first crop of fruit in 1887, and have matured a heavy crop each year since. The borders are all inside, the bottom being cemented. Over the cement is placed a covering of cobblestones for drainage. The soil used was green sod, turned grass-side down, with broken bricks, charcoal, and old plaster to keep the soil open and sweet. The only manure used was broken bone. The soil is from twenty-four to thirty inches deep.

The early house, when planted, was all Hamburgs, but since planting there have been some Madresfield Court and Mrs. Pince inarched into the Hamburgs. The south side of the late house was planted with Muscats; the north side was planted with Alicante and Lady Downes.

The vines are pruned in December, the vines and houses well cleaned, the loose soil on the surface removed and replaced with fresh soil and a little fine bone. There being no plants kept in the vineries from now to the first of March, they are kept as cold as possible, but not to freeze the water in the pipes. About March 1 the borders receive two or three good waterings, the house is kept closed, and the vines started. The temperature is increased as the vines begin to grow. When in flower the Hamburg house is kept at about sixty-five degrees at night; the Muscat house at about seventy. Ventilating is carefully attended to. The vines are syringed from starting until they come into flower, and once after flowering. The borders are kept well saturated with water in the growing season, but never allowed to get dry at any time. When the fruit is swelling weak liquid manure is given.

Yours sincerely,

GEO. MCWILLIAM.

Greenhouses and Grounds of J. S. Bailey, West Roxbury.

We were called upon to visit the greenhouses and grounds of Jason S. Bailey, West Roxbury, on August 4. This place is quite new, not having been under cultivation more than three years, and yet it gives one, on close inspection, the feeling that a much longer time would not be too great to bring the whole place into such perfection of culture, and perform such judicious planting of flowers, trees, and shrubs. William Donald, the gardener, deserves much credit for the effective manner in which he has used the abundant means at his disposal.

Arthur F. Estabrook's Estate, Beach Bluff.

In August your Committee visited the summer estate of A. F. Estabrook, at Beach Bluff. This estate is also entered for the Hunnewell Triennial premium, and this is the second year your Committee have inspected it. It comprises about four acres situated on a rise of ground overlooking the ocean. It is comparatively a new place, but has been reclaimed from what was within a few years nothing but a barberry pasture, but now presents a charming appearance, having been developed into a delightful summer home, such as any one would be delighted to occupy.

Estate of E. S. Converse, Malden.

August 24 your Committee were called to visit the old-fashioned estate of E. S. Converse, of Malden. The mansion is surrounded by fine old specimens of trees, giving the place an indescribable sense of comfort and restful enjoyment, and Mr. D. F. Roy, the efficient gardener, has been very successful in distributing among the trees such beautiful and large specimens of ornamental foliage and flowering plants as make the grounds very attractive. We were very glad to visit this place, as it is kept in complete order at all times and presents such a look of contentment that any one passing must desire to occupy one of the comfortable seats under the fine old trees and dream away a warm summer day in enjoyment.

Col. Frederick Mason's Riverside Farm, Taunton.

On September 8 we again visited Riverside Farm, at Taunton, to view the vegetable garden of Col. Frederick Mason. This farm is one of the best conducted in the State, and is managed by one of

the most efficient farmer-gardeners, Mr. E. C. Lewis. It is a pleasure to see intelligence displayed in the care of stock and the cultivation of the ground, and here you find it in perfection. Our party was composed of the Garden Committee and a few of the best market gardeners of Arlington, and we heard the commendation of experienced men as to the success of Mr. Lewis's mode of cultivation. It was a pleasure to have our judgment confirmed by such good authority as our near-by successful farmers of Arlington, and it was also pleasant to partake of the excellent products of such a farm, under the hospitality of the owner and gardener.

Samuel Hartwell's Gravenstein Farm, Lincoln.

On September 13 we went to Lincoln to inspect the orchards of Mr. Samuel Hartwell. Mr. Hartwell turns his attention principally to the growing of apples, of the best kinds. His Gravensteins were bearing most abundantly, and indeed nearly all his trees presented a splendid sight. The cultivation of an orchard, if carried on intelligently, is probably as lucrative a business as a farmer can pursue. Mr. Hartwell has been very successful with his trees, and we imagine his success is entirely owing to the fact that he knows exactly what a tree needs to make it produce an abundance of good fruit, and to the prompt supply of its needs. He has named his farm from the apple most largely cultivated there.

Warren D. Hinds's Orchards, Townsend.

In September your Committee were called to visit the W. D. Hinds place, at Townsend, in the northern part of the State. This visit was to inspect the orchards on this place, which were composed of apple, plum, and peach trees. We were highly pleased with Mr. Hinds's farm, which was situated on very high ground, a capital place for fruit-growing, as early and late frosts do not, generally, affect orchards on high elevations so badly as those situated on low or level ground. Mr. Hinds was very successful this year, showing full crops of excellent fruit. His crop of peaches was enormous, and his plums — the Japanese variety, Satsuma — were of large size and most excellent quality.

Mrs. Benjamin P. Cheney, Sr's., Chrysanthemum House, Wellesley.

On the 2d of November we visited Mrs. B. P. Cheney's place at Wellesley, to inspect a house of chrysanthemums in pots arranged for effect, with other plants interspersed, thus making a very beautiful display. Mr. John Barr, the efficient gardener, exercised great good taste in his decoration, and your Committee were highly gratified with what they saw.

The Nevins Estate, South Framingham.

On November 3 we were called upon again to visit the David Nevins estate to view violets in frames and chrysanthemums on benches. The violets were of superior quality, consisting of five kinds, very profusely flowered and perfectly healthy. They were grown during the summer on the east side of a hedge, in good rich soil, and did not develop any fungous disease during their growth. The chrysanthemums on benches were grown to a single flower, and were of superior excellence. Mr. Alexander McKay's method of growing these two plants is to be commended, and it was a pleasure to witness the success of so good a gardener.

Edmund M. Wood & Co.'s Conservatories, Natick.

Our next visit, which occurred November 1, was to the Waban Conservatories at Natick. They are conducted by Edmund M. Wood & Co. The object was to view chrysanthemums on benches, and a rose house. Every one who has been at these greenhouses is struck with the very cleanly way in which everything is grown. Great credit is due to the gardener-superintendent, Mr. Alexander Montgomery, for his skill and knowledge in the noble art of horticulture, for in these greenhouses, covering many acres, we find only the highest cultivation, and perfect success is the result of his knowledge. We were very highly pleased with the whole establishment.

J. S. Bailey's Chrysanthemum House, West Roxbury.

We were called, on November 4, to the beautiful estate of J. S. Bailey, at West Roxbury, to inspect a house of chrysanthemums arranged with other decorative plants to produce the most pleasing effect. The greenhouse was a circular one, with a stage

around the inside of the whole house, elevated just enough to allow visitors to look down on the magnificent plants and beautiful arrangement to the best advantage. The plants were admirably grown, and the arrangement was exquisite, reflecting great credit on Mr. Bailey and his efficient gardener, Mr. William Donald. The Committee were highly gratified with their visit to Mr. Bailey's hospitable mansion and his beautiful greenhouses.

E. N. Peirce & Co.'s Greenhouses, Waltham.

On November 8 your Committee were called upon to visit a commercial place owned by E. N. Peirce & Co., of Waltham. This place, in the winter and spring, is devoted to growing vegetables for the market, but in the fall is filled with chrysanthemums for the same purpose. Messrs. Peirce & Co. marketed about seventy-five thousand blooms this fall, and when we visited the houses they were a superb sight to behold; the blooms were fine, well-developed, and of good size. They were cutting at that time from one to three hundred dozen blooms per day, and were getting good prices for them. One day they cut five thousand blooms.

George Marston Whitin's Orchid House, Whitinsville.

We had a cordial invitation again to visit the greenhouses of George M. Whitin, at Whitinsville, on December 20, to inspect a house of Calanthes which were in full bloom. Mr. George McWilliam, the experienced and successful gardener, had arranged the orchids among beautiful foliage plants, and they presented a grand appearance. Over one hundred pans of Calanthes, called by Mrs. Whitin the "Christmas Orchid," averaging more than five spikes to a pan, were a most gorgeous sight. Dendrobiums, Cypripediums, etc., were interspersed, making a sight not often seen in this country, and which when seen is not soon forgotten. The hospitality of Mr. and Mrs. Whitin and family was profuse, and the visit will be long remembered by a large number of invited guests as one of the most delightful of the year.

We are very much pleased to give in Mr. McWilliam's own words his method of growing Calanthes, as follows:

Whitinsville, Dec. 30, 1898.

Mr. Norton, *Chairman of Garden Committee:*

Dear Sir: In reply to your request as to how we grow Calan-

thes I would say that those grown here are all deciduous varieties, as they are the best for cut flowers. They are grown in a low narrow house, and kept near the glass. The glass is kept lightly shaded, and in summer a roller blind is used over the shaded glass. They are grown in both pots and seed-pans, and they require good drainage. The soil used is turfy loam with the fine part shaken out, a little fine bone, dried cow manure or leaf soil, and sand being added. When first potted a little water is given until they are well rooted, when they receive water liberally, and a little liquid manure when the bulbs are swelling, withholding the manure water when they commence to flower, but giving clean water as long as the leaves are green. When the flowers are cut the plants are placed beneath a stage where there are no hot pipes, and the temperature is kept at nearly sixty degrees all the time. When growth commences the bulbs are shaken out, the old roots cut off, and the bulbs placed on sand and put up to the light until the new roots appear, when they are potted. To grow Calanthes well requires a warm house — not under sixty at night, but seventy is better.

I herewith hand you a list of the varieties of Calanthes grown here, for your report:

C. Veitchii, one plant, to compare with *superba*.

" " improved, one plant.

" " *superba*, many.

" " *compacta*, of which I am getting a good stock. The bulbs and flower spikes of this one are much shorter than those of the others; but there are equally as many flowers and as large, which makes them much closer on the spike. The flower is of a soft, pleasing color, but of course you saw them when here.

C. Sandhurstiana, of the same parentage.

C. Veitchii — quite distinct; it comes into flower a little later and is much deeper in color.

C. vestita luteo-oculata.

" " *rubro-oculata*.

" " *oculata gigantea*.

C. Regnieri, two varieties.

These last two varieties come into flower about the time the others are generally past.

Yours truly,

GEO. MCWILLIAM.

William Nicholson & Son's Carnation Houses, Framingham.

We were called on December 21 to visit the commercial greenhouses of William Nicholson & Son, at Framingham, to view their carnation houses. This firm is reaping the benefit of skilful and thorough methods of growing anything they undertake. There is no haphazard way of doing things here, but the careful experience of a good many years is applied, which produces success every time. It is a pleasure to see knowledge applied to horticulture, as it is practised on this place, for the result is always successful, and the purchasers of the product are always satisfied. The carnations were pictures of robust health, and very profusely bloomed.

Sumner and Frank E. Coolidge's Greenhouses, Mount Auburn.

December 22 we visited a range of large greenhouses, belonging to Sumner and Frank E. Coolidge, at Mount Auburn. They were filled with violets, lettuce, etc. The violets had in the early fall been attacked with fungus, but when we saw them they appeared to be recovering, and would, later on, produce an abundant crop. The lettuce house contained sixteen thousand five hundred heads, in very fine condition, giving promise of a good result, as the plants were in nearly marketable sizes.

The prizes awarded this year are as follows:

H. H. Hunnewell Triennial Premiums.

For an estate of not less than three acres, which shall be laid out with the most taste, planted most judiciously, and kept in the best order for three consecutive years:

First, Mrs. David Nevins	$160 00

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums, arranged for effect, with other plants, in pots:

First, Jason S. Bailey	50 00
Second, Mrs. B. P. Cheney	30 00

Society's Prizes.

For the best house or houses of Chrysanthemums grown on benches:

First, Edmund M. Wood & Co.	40 00
Second, Mrs. David Nevins	30 00

For the best house of Foreign Grapes:	
First, George Marston Whitin	30 00
For the best house or frames of Violets:	
First, Mrs. David Nevins	30 00
For the best Carnation house:	
First, William Nicholson	30 00
For the best Vegetable Garden:	
First, Col. Frederick Mason	40 00
Second, George D. Moore	30 00
For the best house of Forced Vegetables:	
First, George D. Moore	40 00
Second, Sumner Coolidge	30 00
For the best house of Roses:	
First, E. M. Wood & Co.	40 00

Gratuities.

Jason S. Bailey, for Greenhouses and Grounds	25 00
E. S. Converse, " " " "	25 00
E. N. Peirce & Co., for Chrysanthemums	25 00
George Marston Whitin, for Orchid House	35 00
Samuel Hartwell, for Orchards	25 00
Warren D. Hinds, " "	25 00

Respectfully submitted,

PATRICK NORTON,
AZELL C. BOWDITCH,
J. WOODWARD MANNING,
E. W. WOOD,
CHARLES N. BRACKETT,
JOSEPH H. WOODFORD,
HENRY W. WILSON,
JACKSON DAWSON,

Committee on Gardens.

REPORT

OF THE

Committee on School Gardens and Children's Herbariums

FOR THE YEAR 1898.

By HENRY LINCOLN CLAPP, Chairman.

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

The space used for a garden, 72 × 48 feet, is now so crowded with plants, mostly perennials, that additions have been nearly stopped for lack of room. Most of the one hundred and fifty species introduced have grown vigorously, and many must be thrown away, as usual, in the spring when the garden is put in order.

The pupils of the school have made much of sketching plants in various stages of growth in the garden. Beginning with the early spring flowers, they indicated in notebooks the interesting developments of leaf and flower buds, visiting the garden at intervals of two or three days, in fair weather, until the close of school in June.

The ferns have been studied by pupils of the ninth grade, as usual, ten species having been carefully observed during the three autumn months. Five more species, together with all the more interesting crosiers, will be studied in the spring.

Many pupils of the ninth grade have made fern gardens at home. One of these pupils, Cora L. Tiley, at the last exhibition took the

first premium for fifteen finely mounted specimens of ferns, and Clara M. Hathaway, a pupil of last year's class, was awarded a gratuity for eighteen excellent additions of ferns.

All pupils of the seventh grade have made a study of the composite flowers growing in the garden.

Among the eleven species of iris is *Iris Pseudacorus*, the beautiful yellow species of the English marshes. When it began to blossom last June each flower had the regular three falls and three standards. About ten days later every flower was found to have four falls and four standards. My attention was called to the phenomenon by Miss Huston of this Committee.

Next June it will be watched with much curiosity to see if the singular metamorphosis is repeated.

COMPOSITE FLOWERS. GEORGE PUTNAM SCHOOL GARDEN

CHILDREN SKETCHING. GEORGE PUTNAM SCHOOL GARDEN.

CURTIS SCHOOL GARDEN, MEDFORD.

Dear Mr. Davenport: In compliance with your request, I send you a partial report of our school-garden work this season. I fear I cannot give you a complete list of the plants added, as, not knowing you would wish for it, I have not kept one. We have, however, added quite a number of wild flowers, as in all our visits to the woods we try to bring some roots which we had not before. Among those added the past summer have been hepatica, two new varieties of violets, early milkweed, herb Robert, rhodora, *Polygala polygama*, tall buttercup, butterfly weed (from Martha's Vineyard), and knapweed. One or two of these were to replace others which were planted last year and failed to appear this spring; but most of them were additional to the list which I sent you last year. In the line of trees we have added a cut-leaved birch, a tulip tree, a walnut (donated by the janitor), a native maple, and a native horse-chestnut. The last two were objects of much interest, as the maple was brought from the woods by one of the children, and the horse-chestnut was

IRIS VERSICOLOR. GEORGE PUTNAM SCHOOL GARDEN.

found and dug up carefully (sprouted, nut and all, complete) by a little boy in the first grade. It gave a valuable lesson on germination and was looked at with added interest, coming as it did just after our lessons on germination illustrated by the bean, pea, etc.

The garden has been a great source of pleasure as well as instruction throughout the year. We have been able to use the material there in many of our nature and drawing lessons. From the early spring, when the children hailed with delight the first appearance of the bloodroot and the tiny coils of the maiden-hair, hardly a day has passed that some one has not come at recess or before school to tell me of some new development in "our garden," as they love to call it. *There*, it seems to me, is the great value of a school garden, in a locality like ours, at least. The children can watch the daily growth and development of the plant and appreciate its wonders so much more fully than by just picking a bunch of blossoms when out for a walk.

While trying all the time to add to our wild-flower collection, we have also devoted several beds to garden flowers. We had several new beds dug last fall ready for seeds in the spring. The planting was done by the children, as far as possible, and always with some class observing. The weeding (except during vacation, of course) was done by them, and I think you will agree with me that they did very nicely for such young children. They found the gathering of the seeds an interesting part of their October nature work, and so have had an excellent opportunity for observing the complete cycle of plant life from seed to seed again. We also planted cannas, dahlias, and gladioli, and these were used in the November lessons on bulbs, tubers, etc. In connection with the lessons on bulbs we planted a number for spring blooming.

The children have tried to keep the yard, as well as the garden, in a neat and orderly condition, and we have received many compliments upon their appearance. Nothing was disturbed through the long vacation, which, considering all things, is an indication of the influence of the garden upon those who pass it daily. At least, that is the way it seems to me.

We were greatly encouraged last year by the approval given us by your Committee and enabled thereby to do quite a little which we could not otherwise have done. Should the Committee see fit to aid us this year, it will be most gratefully appreciated, and, after consultation with you, used where it would seem to bring the best result.

Respectfully submitted,

AMY WHITMORE JONES,

Principal Curtis School.

To MR. G. E. DAVENPORT.

SWAN SCHOOL GARDEN, MEDFORD.

DEAR MR. DAVENPORT: As requested, I send you a report of our school garden, and the use which the teachers and children have made of it during the year 1898.

As you know, our garden contains a large number of wild flowers, — which number we are always endeavoring to increase, — a large variety of ferns, and some trees and shrubs. We have also set apart one bed for garden flowers, such as geraniums, dahlias, etc., and another bed in which the children may plant seeds, and so observe from time to time the germination and growth of plants.

Our wild flowers are a great help to us in our nature study, and as the years roll by, and our garden develops more and more, it will become invaluable to the teachers and pupils.

We have, in our nature study, besides our talks with the children, directed most of our energy to the drawing and painting of the plants and flowers, feeling that the children in this way must make a thorough study of the growth of the same.

The care of the garden, except during the vacations, has devolved upon the children. The interest which they have shown in this, and the great care and knowledge exhibited in their weeding and caring for the beds, have certainly been encouraging.

We thank you for the interest which your Committee have shown us in the past, and trust we may merit the same in the future.

Respectfully submitted,

ROSE ATKINSON PLUNKETT.

BLOODROOT. GEORGE PUTNAM SCHOOL GARDEN.

SCHOOL GARDEN IN BATH, MAINE.

In 1896 a school garden was established in Bath, Me., by Miss Viola G. Hogan, one of the assistants in the High School. The janitor dug the ground and has occasionally furnished help when needed; but Miss Hogan, with the assistance of some of the pupils, has done all the work of stocking the garden and taking care of the plants. She has also borne the only expense thus far incurred, that of buying tags for labelling.

The garden now contains the following native flowering plants and ferns:

Antennaria plantaginifolia,
Aquilegia Canadensis,
Arisæma triphyllum,
Aster acuminatus,
" *cordifolius*,
" *diffusus*,
" *linariifolius*,
" *longifolius*,
" *macrophyllus*,
" *multiflorus*,
" *paniculatus*,
" *umbellatus*,
" *vimineus*,
Chimaphila umbellata,
Clintonia borealis,
Cypripedium acaule,
Dalibarda repens,
Gaultheria procumbens,
Geum rivale,
Hepatica triloba,
Houstonia cærulea,
Iris versicolor.
Linnæa borealis,
Medeola Virginiana,
Myosotis laxa,
Oakesia sessilifolia,
Polygonatum biflorum,
Pyrola rotundifolia,
Sarracenia purpurea,
Saxifraga Virginiensis,
Smilacina racemosa,
Solidago arguta,
" *bicolor*,
" *Canadensis*,
" *juncea*,
" *lanceolata*,
" *latifolia*,
" *nemoralis*,
" *puberula*,
" *rugosa*,
" *sempervirens*,
" *squarrosa*,
Streptopus roseus,
Symplocarpus fœtidus,
Trientalis Americana,
Viola blanda,
" *cucullata*,
" *rotundifolia*,
" *sagittata*.

FERNS.

Aspidium acrostichoides,
" *cristatum*,
" *marginale*,
" *Noveboracense*,
" *spinulosum*,
" " var. *intermedium*,
" *Thelypteris*,
Asplenium ebeneum,
" *Filix-fœmina*.
Botrychium ternatum,
Dicksonia pilosiuscula,
Onoclea sensibilis,
Osmunda cinnamomea,
" *Claytoniana*,
" *regalis*,
Phegopteris Dryopteris,
" *polypodioides*,
Polypodium vulgare.

Some plants have died, as they depend wholly on the atmosphere for moisture during the summer vacation, but these have easily been replaced.

Many of the pupils show great interest in observing the growth of the plants and in learning to distinguish the various species; and several have already made wild gardens of their own. The botany class, also, makes use of the flowers.

The establishment of this garden has been purely a labor of love, as Miss Hogan does not teach botany, that department being in charge of another teacher; and it presents a striking example of what one interested teacher can do, without asking for an appropriation of money or waiting to see if somebody else will give a large number of plants to begin with.

Why cannot other school gardens be started in the same spirit? It is the garden begun with a few plants and a great amount of interest on the part of the teacher which is destined to increase and flourish, and to inspire boys and girls with a genuine love for this delightful work.

CHILDREN'S GARDENS IN DAYTON, OHIO.

In Dayton, O., the National Cash Register Company has made a very successful attempt to improve the homes of residents of a district called South Park. Attention is given to the condition of the roadways, gutters, curbs, sidewalks, fences, trees, grassplots, dooryards, back yards, shrubbery, etc. The sum of two hundred dollars is offered in prizes, including

"I. PRIZES TO BOYS.

"Fifty dollars in gold for the best five vegetable gardens, to be divided as follows: $15, $12, $10, $8, and $5.

BOYS' GARDEN, SOUTH PARK, DAYTON, O.

"Open to not more than forty boys (ranging in age from 8 to 15 years, inclusive) residing in South Park and selected by the Mothers' Guild.

"The N. C. R. Company provided and ploughed the ground, furnished the seeds, and permitted the use of tools for the cultivation of the plats.

"II. Prizes to Boys and Girls.

"Fifty dollars in gold (same as in the preceding) for the best-kept five back yards — whether planted with flowers, vines, shrubbery, or grass, or devoted to vegetable garden.

"Open to all boys and girls in South Park."

"The Boys' Gardens.

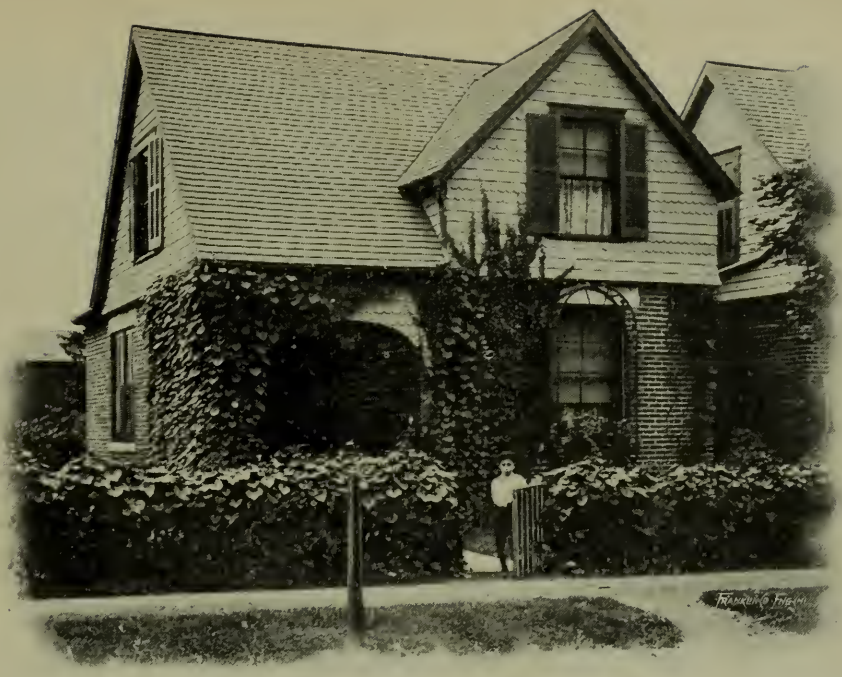
"The Committee on Boys' Gardens referred to the interest which the experiment had attracted, not only in South Park, but throughout the city, and mentioned the fact that hundreds of people from all parts of the city had visited the gardens during the summer. This Committee gave frequent inspections during the growing season to the work done, and congratulated the boys very heartily upon their perseverance and the intelligence shown in the cultivation of the ground allotted them. The quantity of vegetables raised in these gardens, the Committee says, will compare favorably with the results attained by persons of more mature years and experience. The Committee also expressed gratification at

A FIRST-PRIZE WINNER, DAYTON, O.

the evidence in improvement in skill and judgment apparent in the work of the young gardeners as the months passed by."

This commendable work appears to have been started by Mr. J. H. Patterson, the president of the N. C. R. Company. Rev. Mr. Sinclair, in speaking of the enterprise, said, "We are getting to see that religion is not simply singing hymns and praying, but it is, as well, right living, with pleasant homes and clean yards. The only regret that I have is that the people throughout the city cannot see this audience and witness this scene. These views (of gardens and yards on exhibition in the chapel) ought to be on exhibition in every corner, and wake up the entire city.

"Mr. Patterson has his reward for this work. He may not



PRIZE FRONT YARD, DAYTON, O.

PRIZE BACK YARD, DAYTON, O.

get it in dollars and cents, but in satisfaction for good deeds, for he has learned that the only thing worth living for is the kindly feeling for our fellow-men."

With a similar feeling the Massachusetts Horticultural Society and the Committee on School Gardens and Children's Herbariums have undertaken a similar work and carried it to a successful result. Dayton and Boston have a bond of sympathy.

TRENTON PUBLIC SCHOOLS.

SECOND SEASON OF SCHOOL GARDEN FOR SCHOOL NO. 15.

DECEMBER 16, 1898.

MR. HENRY L. CLAPP:

DEAR SIR: In answer to your letter of the 12th: We begin our planting of seeds in our schoolrooms, the children watching the development of such plants as corn, beans, peas, etc.; then, as the spring advances, the seeds and plants are placed in the outdoor gardens by the children, they doing all the work and being very much interested in it.

We plant hardy plants for the summer months, with dahlias and chrysanthemums for fall blooming.

Our idea in starting the gardens in the first place was simply to try to cultivate a love for the beautiful in those living in the vicinity of the school, and by this means to raise the moral tone of the neighborhood.

The children, guided by the teachers, take entire care of the beds.

We find it very helpful in giving science lessons in the primary grades, besides the gain from an ethical standpoint, so that they have been worth all the time and thought given to them.

I am

Yours very truly,

ELIZABETH HUGHES.

A GERMAN SCHOOL GARDEN.

Dr. Herman T. Lukens, formerly professor in Clark University, last spring visited the George Putnam School Garden, and during the summer vacation went to Germany to observe methods of

GERMAN SCHOOL GARDEN.

education there. In his "Notes Abroad," thoughtfully sent to your chairman, is found this interesting paragraph:

"Dr. O. W. Beyer took his class up the Saale valley to Pössneck to examine one of the best organized school gardens in Germany. There, on a plot of ground prepared in 1895 at a cost of $750 and requiring an annual outlay of only $75, six hundred pupils have each his or her separate garden patch, and every day between five and six P.M. they come to weed, water, hoe, train, or otherwise attend to, and reap, what they have sown. The central path in the garden is reserved for the parents, who come there to promenade and enjoy the sight as well as to encourage their children and help them carry off the armloads of cabbages, potatoes, lettuce, onions, turnips, and flowers for home consumption.

Besides these separate beds, the garden contains a tree nursery, a frame shed for class use (as the school building is fifteen minutes distant), separate sections for industrial plants, — hemp, flax, wheat, corn, rye, etc., — for poisonous plants and noxious weeds, for alpine or mountain flora, and for swamp plants. As far as possible, plants that grow together in nature are kept together under natural conditions in the garden."

CANADA VIOLET. GEORGE PUTNAM SCHOOL GARDEN.

The high educational value of the work may be learned from the next paragraph:

"Dr. Beyer has been commissioned to revise the entire curriculum from this new standpoint of handwork, bringing everything into organic relation with it, and making it the centre out of which the other school subjects grow."

CHILDREN'S HERBARIUMS.

An extraordinary number of herbarium specimens were sent for the exhibition Nov. 25 and 26, 1898. There was not sufficient space in both halls for displaying all the plants. From one thousand three hundred and sixty-six sheets last year the number rose to two thousand two hundred and fifty-two this year, and that, too, without any special effort being made by the Committee. Such a result shows that the work has come to stay.

It has taken years of work to spread abroad the information necessary to insure a natural and permanent growth; yet at the eleventh hour new exhibitors appear every year, declaring that they have just heard of the exhibition.

If the herbariums continue to increase in number and size, which seems certain, it will be necessary in future to exhibit only the most meritorious collections, and, therefore, those who intend to exhibit will need to consider the quality of their work especially — fine specimens, artistic mounting, careful naming, neat writing, and the name of the town where the specimen was found should be added.

Vanessa Denton's one hundred and twenty-seven additions of flowering plants, considering the number of specimens and the quality of the mounting, was the most remarkable. "No ordinary collector or professor of botany would mount specimens as beautifully as those are mounted; he couldn't spend the time," a botanist was heard to say. "Well," said another, "she says she is going to be a professor of botany one of these days, and she is only twelve now. This is the second time she has exhibited, but she has never seen an exhibition of this kind here because she was in Europe, or on her way there, with her father, who has become so famous for his collections of butterflies. She is a born naturalist."

Rachel P. Snow, eleven years old, will have an interesting experience to look back upon when she is twenty. She exhibited this year for the first time and took the second prize for one hundred specimens. She began to study plants and then interested her parents to work with her. Her father bought a nice microscope, and her mother a botany. Then the mother took private lessons in botany, and all three worked together in a delightful manner, and all attended the exhibition and manifested in a quiet, studious way much discrimination on fine points, such as are found in the more difficult species of violets, pyrolas, etc.

The largest number of specimens sent by one collector was three hundred and forty-two additions of flowering plants. During the flowering seasons of 1896, '97, and '98 George E. Nichols must have had very busy, interesting, and instructive times in order to send so many complete and well-mounted specimens in addition to one hundred different specimens sent in 1895. By this time he has learned what a rare plant is.

The youngest exhibitor was Charles Withington, seven years old. Without knowing anything about our exhibitions or receiving any stimulus from them he collected and mounted one hundred and thirty-five plants on thirteen sheets. Of course the mounting and writing were hardly up to exhibition standards, but his natural interest was remarkable, and that put him in the right attitude to learn quickly from the exhibits. Besides the collections already mentioned, especially fine ones were sent by Maude Clark and Melora Warner, of the Manchester High School, Genevieve Doran and Rachel P. Snow, of Watertown, and Olive L. French and Bessie R. Parmenter, of South Sudbury.

Arthur E. French, of South Sudbury, sent some very rare plants — two sedges, four grasses, and sixteen flowering plants. Having exhibited every year since 1893, the plants unknown to him in his locality are rare indeed. And he is a rare boy.

Phillips Barry, Arthur C. Faxon, George E. Nichols, Marion C. Goward, and Lulu D. Ellis have shown the same natural love for plants, and the same persistency in hunting them out. It is very gratifying to your Committee to have seen children pursuing such work with unabated interest for four or five years, until they had thoroughly searched their own neighborhood for plants, or had reached the maximum age prescribed for exhibitors. This is the way genuine botanists are made. Apparently no other expenditure or work of this Society yields larger returns. From this seed-planting we may reasonably expect much fine fruit within a generation.

The Houghton High School, of Bolton, sent a fine school collection. Six girls belonging to the school exhibited individual collections. However, the whole work seems to have been started by one interested teacher, who did not wait until she had acquired a mass of botanical knowledge herself for fear of making a mistake in teaching or naming plants, but started right in to work and learn with the children. The spirit is superior to cut-and-dried methods; it will find a method for itself. The old notion among

teachers of infallibility, of not making a mistake, is even now preventing children from getting a love for plants as beautiful, growing things. And this Society is doing excellent work in breaking up that ancient notion, by sending children directly to plants, whether accompanied by teachers or not, and by encouraging both pupils and teachers to help themselves.

Our friends, the reporters for the principal Boston newspapers, promptly appeared when the exhibition opened, and each gave several generous and appreciative notices, which undoubtedly contributed much to the satisfactory attendance of visitors, fifty at a time being counted.

For the Committee,

HENRY L. CLAPP,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, Roxbury, first prize	$15 00
Curtis School, Medford, second prize	12 00
Swan School, Medford, third prize	10 00
High School, Bath, Me., gratuity	8 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS. — For one hundred and twenty-five specimens:

First prize, Melora Warner	5 00
For one hundred specimens:	
First prize, Maude Clark	4 00
Second, Rachel P. Snow	3 00
For seventy-five specimens:	
First prize, Bessie R. Parmenter	3 00
Second, Ella S. Waite	2 00
For fifty specimens:	
First prize, Edith Newton	2 00
For twenty-five specimens:	
First prize, Cora L. Mentzer	1 50
Second, Zipporah Sawyer	1 00
For ten specimens:	
First prize, Gonnard Landberg	75
Second, James Steele	50

Gratuities:

George E. Nichols, for three hundred and forty-two additions	7 00
Vanessa Denton, for one hundred and twenty-seven "	5 00
Genevieve Doran, for one hundred and twenty-five "	4 00
Marion C. Goward, for one hundred and twenty-five "	3 50

Florence A. Grey, for one hundred and twenty-five specimens	3 00
Ethel Nixon, for one hundred and twenty-one specimens	2 75
Bessie A. Eckert, for seventy-five specimens	1 50
Olive L. French, for seventy-five additions	3 00
Marion Withington, for fifty specimens	1 25
Cora A. Jacobs, for thirty-three specimens	75
Arthur E. French, for sixteen additions	2 50
Charles Withington, for thirteen sheets	1 00
John D. Fallon, for ten specimens	50
Leonard A. Page, for ten "	50
Ferns. — For twenty-five specimens:	
First prize, Amelia Etzensperger	4 00
Second, Marion C. Goward	3 50
For fifteen specimens:	
First prize, Cora L. Tiley	3 00
For five specimens:	
First prize, Melora Warner	75
Gratuities:	
Clara M. Hathaway, for eighteen additions	3 50
Arthur E. French, for four additions of grasses	1 00
Arthur E. French, for two additions of sedges	1 00

SCHOOL HERBARIUMS.

Houghton High School, Bolton, first prize for four classes — flowering plants two hundred and thirty-eight, ferns nine, leaf sprays nineteen, grasses five	4 00
Total for Herbariums and Gardens	$124 75

The amount of money appropriated by the Society for the use of this Committee was		$250 00
Awarded for School Gardens	$45 00	
Awarded for Herbariums	79 75	
Kilburn & Cross (cut)	5 00	
Printing	25 75	
Advertising	18 20	
Expressage, postage, stamping, etc.	9 80	
	——	183 50
Balance unexpended		$66 50

Henry L. Clapp, Roxbury,
Mrs. H. L. T. Wolcott, Dedham,
George E. Davenport, Medford,
Miss Katharine W. Huston, Roxbury,
Mrs. P. D. Richards, West Medford,
William P. Rich, Chelsea,
W. E. C. Rich, *Secretary*,
99 Moreland st., Roxbury, Mass.

Committee on School Gardens and Children's Herbariums.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS

FOR THE YEAR 1898.

By JOSEPH H. WOODFORD, Chairman.

The year just about closing has been one of unusual importance to our Society, and the exhibitions, numbering twenty-three in all, have been attended by great multitudes of people.

The halls have been arranged in such a manner as best to accommodate the increased number of exhibitors. At some of our shows (notably the chrysanthemum exhibition) the lower hall was very much overcrowded with magnificent flowers, yet when the exhibition was opened to the public at twelve o'clock, noon, it presented a grand appearance; for here was displayed the finest collection of chrysanthemum flowers ever exhibited in this country.

The hall was arranged with the greatest extent of table room possible, and in the best possible manner consistent with the limited space at the disposal of your Committee.

It is a pity that we have not a fine hall on the ground floor, of sufficient capacity to contain, without crowding, all the exhibits, and, in addition, sufficient space for the comfort of exhibitors and the public.

No one feels more the want of more expanded quarters than does your Committee, for it is at times very embarrassing to find room for exhibits in such limited quarters as are now at their disposal.

We would again call attention to our Report for the year 1895, in which we allude to the poor accommodations we then had for our exhibitions, and we are sorry to say they still exist, and at present we see no immediate prospect of relief.

We are under renewed obligations to the press for the copious reports of our exhibitions which they have so faithfully published; and we are also glad to report enthusiastic competition by new members of our Society, thereby filling up any vacancies occasioned by the dropping out of some of the older exhibitors.

The amount of money placed to the credit of your Committee for extraordinary expenses has been expended judiciously, and for the best interests of our Society.

The receipts for admission to the two shows at which fees were exacted will appear at the end of this report, and we fully believe they would have been very much greater had we had at our disposal better accommodations for the comfort of our patrons.

From the Treasurer's books we take the following:

Receipts at Spring Exhibition	$294 00
Receipts at Chrysanthemum Exhibition . . .	568 50
	$862 50

all of which is in the Treasury of the Society.

Respectfully submitted,
For the Committee,
Jos. H. Woodford,
Chairman.

REPORT

TO THE

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1898.

The Massachusetts Horticultural Society began its year of 1898 with a series of lectures which continued through March. A full report of them is made in Part I. of the TRANSACTIONS of the Society for this year.

January 8. "The Business Side of Fruit Culture," by Mr. J. H. Hale, South Glastonbury, Conn.

January 15. "Horticulture in Holland: Decoration in Public Parks, Bulb Growing, Nursery Stock at Boskoop." (With stereopticon illustrations.) By Mr. John K. M. L. Farquhar, Boston, Mass.

January 22. "Originating New Vegetables," by Hon. Aaron Low, Hingham, Mass.

January 29. "Nuts and Nut Culture," by Mr. Frank M. Bartram, Parry, N.J.

February 12. "Some New Notions about Some Old Insects," by Prof. M. V. Slingerland, Cornell University, Ithaca, N.Y.

February 19. "Trees in Streets and Elsewhere," by Mr. W. R. Smith, Superintendent Botanic Garden, Washington, D.C.

February 26. "The National Flower Movement," by Mr. Frederick Leroy Sargent, President Columbine Association, Cambridge, Mass.

March 12. "The Relation of Our Public Schools to Rural and Urban Life, and the Value of Nature Studies in Our System of Public Instruction," by Mr. George T. Powell, Ghent, N.Y.

March 19. "The Resistance of Plants to Parasitic Fungi," by Prof. E. A. Burt, Middlebury College, Middlebury, Vt.

March 26. "Native Ferns of New England." (Illustrated by numerous lantern slides.) By Mr. Henry Lincoln Clapp, George Putnam School, Boston, Mass.

April 21. "Wild Flowers of the Canadian Rockies," by Mr. Cornelius Van Brunt.

The Spring Exhibition was opened March 22, and continued through the 25th.

The Rhododendron Show was held June 7 and 8.

The Rose and Strawberry Exhibition was held June 23 and 24.

The Annual Exhibition of Plants and Flowers was held August 31 and September 1.

The Annual Exhibition of Fruits and Vegetables was held September 29 and 30.

The Chrysanthemum Exhibition was held for four days, beginning November 8.

There were also held prize exhibitions on Saturdays from 12 M. to 3 P.M., April 2, May 7, May 21, June 11, September 10, September 17, November 5, and every Saturday from July 2 to August 20, inclusive.

The Society offered $8,100 in prizes.

All of the exhibits were fully above the high standard of excellence maintained by the Society and showed a very marked improvement in the gardeners' skill.

Respectfully submitted,

N. I. Bowditch,

Inspector.

REPORT

OF THE

COMMITTEE ON THE LIBRARY

FOR THE YEAR 1898.

The Committee on the Library makes its customary report that its appropriations have been expended in the usual way and the List of Accessions to the Library for the year will show that the increase of the Library by gift and purchase has been very nearly the same as for several years past.

It is well known that the Stickney Fund passes out of our possession at the end of this year, but it becomes us rather to rejoice that we have had it so long than to repine that it is not ours permanently; for, mainly owing to the income we have received from it in these thirty years, this Library has grown from the condition of a humble collection of commonplace books to a place in the very front rank of special libraries. In default of this fund the Committee will ask for an appropriation sufficient to keep the Library moving in the path of progress and improvement.

The crowded condition of our bookcases may cause some to question the wisdom of continuing our purchases before some additional storage room can be provided, but there are many works which must be had soon, if at all. Learned societies and large public libraries are fast gathering in the very few remaining copies of some of these, and the price of those which are left must, of course, advance rapidly. Some of our costliest books could not now be purchased for three times what we gave for them, and duplicates of many of them cannot now be had at any price.

Moreover, as the income of the Stickney Fund was restricted by the donor to the purchase of books, we have not been able to do as much in the way of binding as the needs of the Library demanded.

If these matters be fully understood we have no doubt that the Society will act in that liberal manner which has distinguished it whenever the Library has made requests in the past.

For the Committee,

W. E. Endicott,

Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN.

The publication of Part II. of the TRANSACTIONS for 1897 was much delayed by the failure of the Chairman of one of the awarding committees to make his report, and after delay caused by unfulfilled promises to bring it in, the Committee on Publication were obliged to order that this part of the Transactions be printed without the report in question. Part I. for 1898 was delayed, as last year, by the failure of one of the lecturers to return his lecture, which he had taken home for revision. This failure was caused by an accident which totally unfitted him for any work, and at the last accounts he feared that he had promised what he could not perform. The Committee have therefore directed that in the absence of this lecture the abstract prepared for the "Transcript" be printed in its place. But for these unfortunate occurrences the Transactions above mentioned would have been printed some months earlier than they will now be. Part I. for 1898 is, however, now in type, and will speedily be published. There still remain the third parts for 1896 and 1897, consisting of the List of Library Accessions for those years, but the former is now nearly ready for the printer. The great labor of preparing these lists has prevented an earlier performance of it. The Schedule of Prizes for 1898 was ready before the end of the preceding year, and that for 1899 is now nearly ready to be printed. At the request of the Committee on Establishing Prizes a statement of all the changes made in the Schedule for 1898 to adapt it to the next year has been prepared and printed.

The most notable event in the history of the Library during the present year is the expiration of the interest of the Society in the Stickney Fund. During the thirty years that the Society has enjoyed the benefit of this fund, the income, amounting in all to

$21,000, has been most carefully devoted to the purpose for which it was designed by the donor, and the result is such a collection of books as forms a noble monument to his memory. The names of all these books have been published from year to year, and the most important have been specially mentioned, and the members of this Society should not now need to have the names of even the most noteworthy recalled. If there are any who are not aware of the importance and value of these books — which will increase from year to year — we trust that they will visit this room and learn to appreciate it. But it must not be assumed that Mr. Stickney's gift has left no more to be acquired of books published in the past; and research in botany, horticulture, and kindred sciences was never more active than now, and we may expect that in the future many books will be published which should on no account fail to find a place in our Library. Indeed, among those already published, several classes of books that we have not already acquired might be named of which this would be true, and we cannot doubt that the Society will make an appropriation sufficient for the purchase of such books. In the present crowded state of our bookcases it may be expedient not to purchase so many books as we should if we had ample room, but to devote more time and money to the binding of those which are in need, such as the publications of the United States Department of Agriculture and the Experiment Station Bulletins, of both of which our collection is probably among the most complete in existence. And in the good time, which no one who has faith in the Society doubts is coming, when all its departments shall be provided with ample room, not only for that day, but for further growth, we trust that the Society will meet its claims with an appropriation sufficient to keep up the well-deserved reputation of the Library.

The problem how to increase the usefulness of the Library has been kept constantly in view. Perhaps this end may be better attained by indirect than by direct methods. It will be of little avail to entreat or urge men to come and use books on subjects in which they feel no interest, but the Society is constantly engaged in the work of educating the community in a taste for horticulture, and we cannot doubt that with the growth of this taste the use of the Library will increase. If any one had been asked four years ago what department of the Library was most likely to spring into prominence and usefulness, perhaps the last

that he would have thought of would have been that of Mycology and other branches of Cryptogamic Botany, and yet within that time we have seen such a growth of interest in that very department. And to draw an illustration from that field — I should not be surprised if hidden agencies were now at work which may lead to equal interest in some other department of the Library, or even in the whole subject of botany and horticulture, as the obscure growth of mycelium suddenly makes itself visible in wholesome and delicious mushrooms. It may be doubted whether any library accomplishes all the good that it may be imagined capable of effecting, but we cannot think that the magnificent works purchased by Mr. Stickney's gift, the thought given to their selection, the thousands of books received from other sources, the care and pains taken to perfect copies and sets, and to catalogue and index them, so that they shall rise from the position of a mere collection of books to the dignity of a library, are destined to come to naught, or to fail of ultimate appreciation.

The Card Catalogues of Plates, of Books, and of Subjects treated in the Reports of Experiment Stations throughout the country have been kept constantly in mind, and as much time as could be given, consistently with duty to other departments, has been bestowed upon them. The last mentioned, which is prepared at the Office of Experiment Stations, in the United States Department of Agriculture, although much less extensive than either of the other two, now contains 17,000 cards.

Among the more important books added to the Library during the year may be mentioned Beccari's "Malesia," in three volumes; Lowe's "Yew Trees of Great Britain and Ireland;" Step's "Favourite Flowers of Garden and Greenhouse," in four volumes; Hogg and Johnson's "Wild Flowers of Great Britain," in eleven volumes; a supplementary volume to the last edition of Sowerby's English Botany; Watt's "Dictionary of the Economic Products of India," six volumes in ten; Duthie's "Field and Garden Crops of India," in three parts; a large folio book of Chinese drawings illustrating the Growth and Progress of the Tea Plant; Field's "Ferns of New Zealand;" and the "Pomologie de la France," a work published by the coöperation of French horticultural and agricultural societies, six volumes in three.

An unusually large number of books on Entomology have been purchased, including Buckton's "Monograph of British Aphides,"

in four volumes ; Cameron's " Monograph of the British Phytophagous Hymenoptera," in four volumes ; Humphreys and Westwood's " British Moths," in two volumes ; the " British Butterflies " of the same authors ; Holland's " Butterfly Book ; " and Douglas and Scott's British " Hemiptera Heteroptera," all illustrated with many plates, which, except in the last mentioned, are colored. This, however, is so important a work that the Assistant Entomologist of the Gypsy Moth Commission made two journeys to Amherst to consult it, but now he can find it without going so far. The enthusiasts in the study of Fungi have been remembered by the purchase of Richon and Roze's " Champignons Comestibles et Vénéneux de la France," and Rabenhorst's " Kryptogamen Flora," the latter not yet completed, but already numbering five volumes in eleven parts. We have long possessed the Second Series of " The Phytologist," and now have been so fortunate as to secure the First Series — a much more difficult achievement than to obtain a second series to add to a first.

Robert Manning,
Secretary and Librarian.

December 17, 1898.

TREASURER'S REPORT

FOR THE YEAR 1898.

MASSACHUSETTS HORTICULTURAL SOCIETY, *in account current with* CHARLES E. RICHARDSON, *December 31, 1898.*

DR.

To amount paid on account of Library in 1898:		
For books, periodicals, and binding . . .	$400 00	
From income of J. Stickney Fund for books .	730 74	
		$1,130 74
To amounts paid Interest on Funds for Prizes, credited opposite		1,892 72
" " " " " Notes and Bonds purchased . .		271 45
" " " on Prizes awarded in 1897, paid in 1898, as follows:		
" amounts paid for Plants	$1,938 50	
" " " " Fowers	2,526 00	
" " " " Fruits	1,592 00	
" " " " Vegetables	1,151 00	
" " " " Gardens and Greenhouses .	500 00	
" " " Hunnewell Prizes for Rhododendrons	105 00	
		7,812 50
To amounts paid Committee on School Gardens and Children's Herbariums		183 50
" " " Lake Shore & Michigan Southern R.R. Bonds	$10,415 25	
" " " City of Newton Bonds . . .	24,228 75	
" " " Atchison, Topeka & Santa Fé R.R. Bonds	44,693 25	
" " " Chicago, Burlington & Quincy R.R. Bonds	50,012 50	
		129,349 75
To amounts paid on Notes Receivable		40,000 00
" " " " Loan from National Webster Bank . .		18,000 00
" " " Salaries of Secretary, two Assistants and Treasurer		4,300 00
" " " Salaries of Committees		1,243 00
" " " City Tax		3,141 69
Amount carried forward		$207,325 35

Amount brought forward	$207,325 35
To amount paid Legal Services	4,097 41
" " " Incidentals	854 72
" " " Services on Transactions	78 00
" " " Stationery, Printing, and Postage	1,452 02
" " " Labor	2,392 95
" " " Committee of Arrangements	400 00
" " " Insurance	1,413 37
" " " Repairs	634 05
" " " Furniture and Exhibition Ware	24 15
" " " Heating	775 09
" " " Lighting	882 40
" " " Water Rates	276 20
" " " Lectures and Publication	269 55
Total payments	$220,875 26
Cash balance December 31, 1898	14,105 60
	$234,980 86

Cr.

By Balance of account rendered December 31, 1897			$6,664 89
Received from Building in 1898, viz.:			
Rent of Stores	$11,266 66		
" " Halls	2,500 00		
		$13,766 66	
Received Income from Mount Auburn		3,156 21	
" State Bounty		600 00	
" Admissions and Assessments		1,010 00	
" Annual Exhibitions:			
Gross Receipts	$862 50		
Less Expenses	539 78		
		322 72	
" Interest on Bonds	$5,105 00		
" " " Town Notes	953 87		
" " " Legacy from F. B. Hayes,	1,722 12		
" " " Bank Balance	391 84		
		8,172 83	
" Copies of History		5 50	
" Notes Receivable		40,000 00	
" Sale of Transactions		1 00	
" H. H. Hunnewell, Prize money for 1897		55 00	
" A. P. Loring, Executor		15,000 00	
" Francis Brown Hayes Fund		10,000 00	
Amounts carried forward		$92,089 92	$6,664 89

Amounts brought forward			$92,089 92	$6,664 89
Received	Bequest of Francis Brown Hayes		133,333 33	
"	Henry A. Gane Memorial Fund		1,000 00	
"	Interest credited following Funds, charged opposite:			
	Samuel Appleton Fund	$50 00		
	John A. Lowell "	50 00		
	Josiah Bradlee "	50 00		
	Benjamin V. French Fund	25 00		
	W. J. Walker "	117 72		
	Levi Whitcomb "	25 00		
	Benjamin B. Davis "	25 00		
	Marshall P. Wilder "	50 00		
	John Lewis Russell "	50 00		
	Theodore Lyman "	550 00		
	H. H. Hunnewell "	200 00		
	Josiah Stickney Fund, as agreed	700 00		
			1,892 72	
				228,315 97
				$234,980 86

CHARLES E. RICHARDSON,
Treasurer.

Approved:

H. H. Hunnewell,
A. Hemenway,
Francis H. Appleton,
} *Finance Committee.*

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

December 31, 1898.

ASSETS.

Real Estate		$250,000 00
Stereotype Plates and Copies of History		251 50
Lake Shore & Michigan So. R.R. Bonds		10,415 25
City of Newton Bonds		24,228 75
Chicago, Burlington & Quincy R.R. Bonds		1,000 00
Atchison, Topeka & Santa Fé R.R. Bonds		44,693 25
Chicago, Burlington & Quincy R.R. Bonds		50,012 50
Sinking Fund		23,872 50
Kansas City, Clinton & Springfield R.R. Bonds		1,980 00
Furniture and Exhibition Ware		7,674 90
Library		38,111 47
City of Boston		352 62
Charles I. Quirk		75 00
A. P. Loring, Executor		7,500 00
H. E. Woodward		8,350 81
George A. Sutherland		97 50
Cash on hand and in Bank		14,105 60
		$482,721 65

LIABILITIES.

Mortgage		$1,000 00
Josiah Stickney Fund payable to Harvard College, Feb. 1, 1899		12,000 00
Unexpended balance of Stickney Fund for Books,		1 00
Prize Funds invested in Building:		
Samuel Appleton Fund,	$1,000 00	
John A. Lowell "	1,000 00	
Josiah Bradlee "	1,000 00	
Benjamin V. French "	500 00	
William J. Walker "	2,354 43	
Levi Whitcomb "	500 00	
Benjamin B. Davis "	500 00	
Theodore Lyman "	11,000 00	
H. H. Hunnewell "	3,000 00	
Francis Brown Hayes "	10,000 00	
Henry A. Gane Memorial "	1,000 00	
	$31,854 43	
Amounts carried forward,	$31,854 43	$13,001 00

Amounts brought forward,		$31,854 43	$13,001 00	
Invested in Bonds:				
Marshall P. Wilder Fund,	$1,000 00			
John Lewis Russell "	1,000 00			
H. H. Hunnewell "	1,000 00			
		3,000 00		
			34,854 43	
Prizes for 1898 payable in 1899			8,100 00	
				55,955 43
Surplus				426,766 22
				$482,721 65

CHAS. E. RICHARDSON,
Treasurer.

Membership Account of the Massachusetts Horticultural Society, December 31, 1898.

Life Members per last report	549		
Added in 1898	11		
Commuted from Annual	7		
		567	
Deceased		32	
			535
Annual Members per last report	212		
Added in 1898	18		
		230	
Commuted to Life	7		
Deceased	5		
Resigned	2		
Dropped for non-payment for two years	13		
		27	
			203
Present Membership			738

INCOME FROM MEMBERS.

11 new Life Members @ $30	$330 00
18 new Annual Members @ $10	180 00
7 Commuted to Life @ $20	140 00
Annual Assessments	360 00
	$1,010 00

CHAS. E. RICHARDSON,
Treasurer.

Dr. *Massachusetts Horticultural Society in account with the Proprietors of Mount Auburn Cemetery.* Cr.

For Sales and Improvements within the Cemetery for the year ending December 31, 1898.

To cost of filling up and improving land at Mount Auburn for the year ending Dec. 31, 1898, the Massachusetts Horticultural Society being charged with their proportion of the same:		
Birch to Eagle and Cherry Avenues	$64 68	
Vinca Path and Maple Avenue	55 31	
Yew and Fountain Avenues	66 75	
Glen Avenue	237 19	
	$423 93	
One-fourth of $423.93 is	$105 98	
Balance due Mass. Horticultural Society,	3,156 21	
		$3,262 19

By sales in January	$500 00
" " February	10 00
" " March	651 40
" " April	2,336 00
" " May	3,543 35
" " June	1,380 00
" " July	1,440 00
" " August	225 00
" " September	1,096 00
" " October	915 00
" " November	1,190 00
" " December	130 00
	$13,416 75
Net amount received from Receiving Tomb	1,082 00
	$14,498 75
Less graves repurchased	50 00
	$14,448 75
Deduct for Annual Expenses	1,400 00
	$13,048 75
Mass. Horticultural Society $\frac{1}{4}$ part of $13,048.75	$3,262 19

E. & O. E.

DECEMBER 31, 1898.

H. B. MACKINTOSH, *Treasurer.*

MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF MOUNT AUBURN CEMETERY. *Dr.*

For one-fourth part of the following expenditures for grading new lands for sale during the year 1898:

Birch to Eagle and Cherry Avenues.

28¾ days, men		$64 68

Vinca Path and Maple Avenue.

20 days, men	$45 00	
2¾ days, man and horse	10 31	
		55 31

Yew and Fountain Avenues.

16¾ days, men	$37 69	
7¾ days, man and horse	29 06	66 75

Glen Avenue.

63¼ days, man and horse	237 19
	$423 93
One-fourth of $423.93 is	$105 98

JAMES C. SCORGIE.

Supt. of the Cemetery of Mount Auburn.

MOUNT AUBURN, Dec. 31, 1898.

I certify the foregoing to be a true copy of improvements for the year 1898, rendered by the Superintendent.

H. B. MACKINTOSH,

Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1899.

President.

FRANCIS H. APPLETON, of Peabody.

Vice-Presidents.

CHARLES H. B. BRECK, of Brighton.
BENJAMIN P. WARE, of Clifton.
WALTER HUNNEWELL, of Wellesley.
SAMUEL HARTWELL, of Lincoln.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, of Cambridge.

Secretary and Librarian.

ROBERT MANNING, of Salem.[1]

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, of Jamaica Plain.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Delegate to the State Board of Agriculture.

E. W. WOOD, of West Newton.

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[1] Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.

THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex officio.*

WILLIAM C. STRONG.
WILLIAM H. SPOONER.
NATHANIEL T. KIDDER.
BENJAMIN C. CLARK.
WALTER HUNNEWELL.
CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.

FRANCIS H. APPLETON.
AUGUSTUS HEMENWAY.

Lectures and Publication.

AARON LOW, OF HINGHAM, CHAIRMAN.

JAMES H. BOWDITCH.
E. W. WOOD.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.

GEORGE W. HUMPHREY.
WALTER S. PARKER.
GEORGE E. DAVENPORT.
CHARLES W. SWAN.

Plants.

WILLIAM WALLACE LUNT, OF HINGHAM, CHAIRMAN.

JAMES WHEELER.
WILLIAM J. MARTIN.
ARTHUR H. FEWKES.
ROBERT CAMERON.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.

MICHAEL H. NORTON.
KENNETH FINLAYSON.
FREDERICK S. DAVIS.
JAMES COMLEY.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.

CHARLES F. CURTIS.
O. B. HADWEN.
WARREN FENNO.
SAMUEL HARTWELL.
J. WILLARD HILL.
SUMNER COOLIDGE.

Vegetables.

WARREN H. HEUSTIS, OF BELMONT, CHAIRMAN.

CEPHAS H. BRACKETT.
VARNUM FROST.
WALTER RUSSELL.
AARON LOW.
GEORGE D. MOORE.
JOSHUA C. STONE.

Forestry and Roadside Improvement.

HARVEY N. SHEPARD, CHAIRMAN.

NATHANIEL S. SHALER.
J. D. W. FRENCH.
J. WOODWARD MANNING.
JAMES STURGIS PRAY.

Gardens.

PATRICK NORTON, of Dorchester, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex officiis*.

HENRY W. WILSON. JACKSON T. DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.

WILLIAM J. MARTIN.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.

ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is incorrect in any particular, will confer a favor by promptly communicating to the Secretary any needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus †.

Adams, Henry Saxton, Dorchester.
Adams, Luther, Newton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Allen, Thomas, Boston.
Ames, George, Boston.
Ames, Oakes, 2d, North Easton.
Ames, Preston Adams, Boston.
Amory, Frederick, Boston.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D.C.
Andros, Milton, San Francisco, Cal.
Appleton, Francis H., Peabody.
Appleton, William S., Boston.
Ash, John, Pomfret Centre, Conn.
Asmus, Ernst G., West Hoboken, N.J.
Atkins, Edwin F., Belmont.

Bailey, Jason S., West Roxbury.
Bancroft, John C., Boston.
Banfield, Francis L., M.D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Boston.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
† Barney, Levi C., Boston.
Barrett, Edwin S., Concord.
Barry, John Marshall, Boston.
Barry, William C., Rochester, N.Y.
Bartlett, Edmund, Newburyport.
Beal, Leander, Boston.
Becker, Frederick C., Cambridge.
Beckford, Daniel R., Jr., Jamaica Plain.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Berry, James, Brookline.
Blake, Edward D., Boston.
Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., Dorchester.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Hyde Park.
Bôcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
Bowditch, Azell C., Somerville.
Bowditch, Charles P., Jamaica Plain.
Bowditch, Ernest W., Milton.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.
Brackett, Cephas H., Brighton.
Brackett, Charles N., Watertown.
Bresee, Albert, Hubbardton, Vt.

Brewer, Francis W., Hingham.
Briggs, William S., Lincoln.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brown, Alfred S., Jamaica Plain.
Brown, Charles E., Yarmouth, N.S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, John T., Newburyport.
Bullard, John R , Dedham.
Burlen, William H., Boston.
Burnett, Harry, Southborough.
Burr, Matthew H., Hingham.
Buswell, Frank E., Brooklyn, N.Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Edward C., Brookline.
†Cadness, John, Flushing, N.Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Chadbourne, Marshall W., Mount Auburn.
Chaffin, John C., Newton.
Chamberlain, Chauncy W., Boston.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Dedham.
Chase, William M., Dorchester.
Cheney, Amos P., Natick.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Boston.
Cleary, Lawrence, West Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, South Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.
Converse, Parker L., Woburn.
Coolidge, Joshua, Mount Auburn.
Cottle, Henry C., Boston.
Cowing, Walter H., West Roxbury.
Cox, Thomas A , Dorchester.
Coy, Samuel I., Boston.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
†Crowell, Randall H., Chelsea.
Curtis, Charles F., Jamaica Plain.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

†Daggett, Henry C., Boston.
Damon, Frederick W., Arlington.
Dana, Charles B., Wellesley.
Davenport, Albert M., Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davis, John, Lowell.
Dawson, Jackson T., Jamaica Plain.
Day, William F., Roxbury.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dickerman, George H., Somerville.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.

Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dumaresq, Herbert, Chestnut Hill.
Dunlap, James H., Nashua, N.H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
†Eldridge, E. H., Roxbury.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William, Jr., Boston.
Endicott, William, 3d, Boston.
Endicott, William E., Canton.
Estabrook, Arthur F., Boston.
Everett, William, Dorchester.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, Boston.
Faxon, John, Quincy.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, James, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, J. Henry, Belmont.
Fletcher, John W., Chelsea.
Flint, David B., Boston.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, J. D. Williams, Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Cambridge.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Harrison Square, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Reading.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goddard, Mrs. Mary T., Newton.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendall Green.
Gray, James, Wellesley.
Gregory, Hon. James J. H., Marblehead.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R.I.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
Hanson, P. G., Woburn.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.

Harlow, James F., Quincy.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N.H.
Harwood, George Fred, Newton.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hathaway, Seth W., Marblehead.
Hawken, Mrs. Thomas, Rockland, Me.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Hewett, Miss Mary C., Canton.
Hews, Albert H., North Cambridge.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N.H.
Hoitt, Hon. Charles W., Nashua, N.H.
Hollingsworth, Amor L., Milton.
Hollis, George W., Grantville.
Holmes, Edward J., Boston.
Holt, Mrs. Stephen A., Winchester.
Horner, Mrs. Charlotte N. S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles Wells, Weston.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Dorchester.
Janvrin, William S., Revere.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Boston.
Jones, Jerome, Brookline.
Jones, Dr. Mary E., Boston.
Jose, Edwin H., Cambridgeport.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Brookline.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lancaster, Charles B., Newton.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Learned, Charles A., Arlington.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Brookline.
Lewis, William G., Framingham.
Lincoln, George, Hingham.

Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Swampscott.
Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Lothrop, William S. H., Boston.
†Lowder, John, Watertown.
Lowell, Augustus, Boston.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyon, Henry, M.D., Charlestown.

Mabbett, George, Plymouth.
†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Maine.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Chelsea.
Marston, Howard, Boston.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, Frederick W. G., Boston.
McCarty, Timothy, Providence, R.I.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Herbert, Weston.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D.C.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter, George, Boston.
Monteith, David, Dedham.
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N.Y.
†Morse, Samuel F., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N.H.
Murphy, William Bowen, Boston.
Mutch, John, Brookline.

Newman, John R., Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, Frederick Law, Jr., Brookline.
Olmsted, John Charles, Brookline.
Orpet, Edward O., South Lancaster.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Palmer, Julius A., Jr., Boston.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody, John E., Boston.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Perkins, Edward N., Jamaica Plain.
†Perry, George W., Malden.
Philbrick, William D., Newton Centre.
Pierce, Dean, Brookline.
Pierce, George Francis, Dorchester.
Poor, John R., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Pray, Dr. Mark W., Boston.
Prescott, Eben C., New York.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, George W., Boston.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Dorchester.
Robinson, Warren J., Somerville.
Ross, Henry, Newtonville.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Boston.
Sanford, Oliver S., Hyde Park.
Sanger, Mrs. George P., Boston.
Sargent, Charles S., Brookline.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, J. Montgomery, Boston.
Shaler, Nathaniel S., Cambridge.
Shaw, Christopher C., Milford, N.H.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Siebrecht, H. A., New Rochelle, N.Y.
Skinner, Francis, Boston.
Smith, Benjamin G., Cambridge.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Jamaica Plain.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Sturgis, Russell, Manchester.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M.D., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thompson, Leonard, Woburn.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Trepess, Samuel J., Glencove, L.I., N.Y.

†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary S., Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Newport, R.I.
Weld, Richard H., Boston.
West, Mrs. Maria L., Neponset.
Weston, Seth, Revere.
Wheeler, Frank, Concord.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whittier, Hon. Charles, Roxbury.
Whittier, George E., Groton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R.I.
Willcutt, Levi L., West Roxbury.
Williams, Aaron D., Boston.
Williams, Benjamin B., Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston
Wood, Edmund M., Natick.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Allen, Charles L., Floral Park, N.Y.
Alles, William H., Hyde Park.
Anderson, George M., Milton.
Arnold, Mrs. Anna E., Roxbury.
Arnold, Miss Sarah L., Newton Centre.
Atkinson, Edward, Brookline.
Ayers, Miss Helen F., Medford.

Badlam, William H., Dorchester.
Barker, John G., Melrose.
Barr, John, Wellesley.
Benedict, Washington G., Boston.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Bliss, Benjamin K., East Bridgewater.
Blomberg, Carl, North Easton.
Bock, William A., North Cambridge.
Bolles, William P., M.D., Roxbury.
Bouvé, Lander M., Brookline.
Boyden, Clarence F., Taunton.
Braman, George H., Newton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brown, David H., West Medford.
Brunton, Frank, Boston.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carroll, James T., Chelsea.
Carter, Mrs. Sarah D. J., Wilmington.
Cary, Miss Alice B., Lexington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John W., North Hadley.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clarke, Frederick E., Lawrence.
Clinkaberry, Henry T., Trenton, N.J.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, Mount Auburn.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Councilman, Prof. W. T., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Dawson, Charles Jackson, Jamaica Plain.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Dorr, George B., Boston.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Ewell, Marshall F., Marshfield Hills.

Fenno, Warren, Revere.
Fisher, Sewall, Framingham.
Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
Francis, George E., M.D., Worcester.
French, Charles G., Utica, N.Y.
Frost, Artemas, Belmont.
Frost, George, West Newton.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Brookline.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N.H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.
Grey, Thomas J., Chelsea.

Hall, Charles H., M.D., Boston.
Hall, Stacy, Boston.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, C. S., York, Nebraska.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Henshaw, Samuel, West Brighton, N.Y.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hill, J. Willard, Belmont.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Horton, Herbert A., Brookline.
Houghton, George S., West Newton.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katharine W., Jamaica Plain.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.

Keith, Miss Mary R., Washington, D.C.
Kelsey, Harlan P., Boston.
Kemp, William S., Brookline.
Kennard, Frederic H., Brookline.
Kenrick, Miss Anna C., Newton.

Lancaster, Mrs. E. M., Roxbury.
Lawrence, Henry S., Roxbury.
Lincoln, Miss Agnes W., Medford.
Lomax, George H., Somerville.
Lombard, Richard T., Wayland.
Loring, Charles G., Boston.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Low, Hon. Aaron, Hingham.

Manda, W. A., South Orange, N.J.
Manning, A. Chandler, Reading.
Martin, William J., Milton.
Masten, Cornelius E., Roxbury.
Maynard, Charles, North Easton.
McLaren, Anthony, Westwood.
McMullen, Edgar, Boston.
Meriam, Horatio C., D.M.D., Salem.
Merrill, John J., Roxbury.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Morgan, George M., Boston.
Morison, George Abbot, Cambridge.
Moseley, Frederick Strong, West Newbury.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.
Norton, Michael H., Boston.
Norton, Patrick, Dorchester.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord Junction.
Petremant, Robert, Brooklyn, N.Y.
Pettigrew, John A., Jamaica Plain.
Pickman, Dudley L., Boston.
Pierce, Mrs. F. A., Brookline.
Plimpton, Willard P., West Newton.
Power, Charles J., South Framingham.
Pray, James Sturgis, Cambridge.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Sawtelle, J. M., Fitchburg.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharp, Miss Helen, Boston.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Shepard, Harvey N., Boston.
Sheppard, Edwin, Lowell.
Smith, Archibald, Somerville.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R.I.
Story, Miss Sarah W., Brighton.
Sutherland, George A., Roslindale.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Thatcher, William, Brookline.
Toby, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Wells, Benjamin T., Newtonville.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A., Newtonville.
Wheeler, James, Brookline.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie, Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.

Young, Arthur W., Hingham.
Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments, and any Annual Member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every Annual Member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XVIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Joseph Jefferson, Buzzard's Bay.
Major L. A. Huguet-Latour, M.P., Montreal, Canada.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Ex-Secretary of Agriculture, Nebraska City, Neb.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N.Y.
George W. Smith, Boston.
Hon. James Wilson, Secretary of Agriculture, Washington, D.C.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829, S. Reynolds, M.D., 1832, *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor in Chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Horticultural Department, Cornell University, Ithaca, N.Y.

John Gilbert Baker, F.R.S., F.L.S., Keeper of the Herbarium of the Royal Gardens, Kew.

Charles Baltet, Président de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France.

Peter Barr, London, England.

Archibald F. Barron, Turnham Green, London, W.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, Ex-President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Secretary of the Iowa Horticultural Society, Ames.

William Bull, Chelsea, England.

F. W. Burbidge, M.A., Trinity College Botanic Garden, Dublin, Ireland.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

Malcolm Dunn, Dalkeith, Scotland.

W. T. Thiselton Dyer, C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, England.

Parker Earle, President of the American Horticultural Society, Roswell, N.M.

George Ellwanger, Rochester, N.Y.

Henry John Elwes, F.L.S., F.Z.S., Colesborn, Andoversford, Gloucestershire, England.

William G. Farlow, M.D., Professor of Cryptogamic Botany, Harvard University, Cambridge.

B. E. Fernow, Forestry School, Cornell University, Ithaca, N.Y.

Hon. Robert W. Furnas, Ex-President of the Nebraska State Horticultural Society, Brownville.

Charles A. Goessmann, Ph.D., LL.D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

George L. Goodale, M.D., Professor of Botany, Harvard University, Cambridge.

Obadiah B. Hadwen, President of the Worcester County Horticultural Society, Worcester.

Professor Byron D. Halsted, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N.J.

J. H. Hart, Superintendent of the Botanic Garden, Trinidad.

Dr. F. M. Hexamer, Editor of the American Agriculturist, New York.

J. W. Hoffmann, Colored State University, Orangeburg, S.C.

J. C. Holding, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

The Very Rev. S. Reynolds Hole, D.D., Dean of Rochester, Rochester, England.

Sir Joseph Hooker, K.C.S.I., The Camp, Sunningdale, England.

Josiah Hoopes, West Chester, Pa.

George Husmann, Napa, Cal.

William J. Johnson, M.D., Fort Gaines, Ga.

Charles Joly, Vice-President of the Société Nationale d'Horticulture de France, Paris.

Sir George King, Superintendent of the Royal Botanic Garden, Calcutta.

Professor William R. Lazenby, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.

Max Leichtlin, Baden-Baden, Germany.

G. F. B. Leighton, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

Victor Lemoine, Nancy, France.

T. T. Lyon, President of the Michigan Horticultural Society, South Haven.

Dr. Peter MacOwan, Director of the Botanic Garden, Cape Town, Africa.

Dr. Maxwell T. Masters, Editor of the Gardeners' Chronicle, London.

George Maw, Benthal, Kinley, Surrey, England.

T. C. Maxwell, Geneva, N.Y.

Thomas Meehan, Germantown, Pa.

Dr. Charles Mohr, Mobile, Ala.

F. W. Moore, A.L.S., Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.

Dr. Daniel Morris, C.M.G., D.Sc., M.A., F.L.S., Assistant Director of the Royal Botanic Gardens, Kew, England.

Ch. Naudin, Antibes, France.
George Nicholson, Curator of the Royal Gardens, Kew, England.
Peter Nóvik, Secretary of the Norwegian Horticultural Society, Christiania.
William Paul, Waltham Cross, London, N.
Professor D. P. Penhallow, Director of the Botanic Garden, Montreal, Canada.
Henry Probasco, Cincinnati, O.
P. T. Quinn, Newark, N.J.
Cavalière Enrico Ragusa, Palermo, Sicily.
D. Redmond, Ocean Springs, Miss.
S. Reynolds, M.D., Schenectady, N.Y.
Benjamin Lincoln Robinson, Ph D., Curator of the Gray Herbarium of Harvard University, Cambridge.
William Robinson, Editor of The Garden, London.
Edgar Sanders, Chicago, Ill.
William Saunders, Horticulturist and Superintendent of Garden and Grounds, Department of Agriculture, Washington, D.C.
William R. Smith, Superintendent of the Botanic Garden, Washington, D.C.
Robert W. Starr, Port William, N.S.
Dr. Joseph Stayman, Leavenworth, Kan.
William Sumner, Pomaria, S.C.
Francis Summerest.
William Trelease, Director of the Missouri Botanic Garden, St. Louis.
Dr. Melchior Treub, Director of the Botanic Garden, Buitenzorg, Java.
H. J. Veitch, Chelsea, England.
Henry L. de Vilmorin, Secretary of the Société Nationale d'Agriculture de France, Paris.
William Watson, Assistant Curator of the Royal Gardens, Kew, England.

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Alabama (Canebrake Station). — All Bulletins later than 18, and all Annual Reports later than the 3d, for 1890.

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New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. 1st to 7th Biennial Reports. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota. — 4th Annual Report, for 1893.

Ohio. — All Bulletins of First Series, except 16, 17, 18, and 19.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Bulletin of Information No. 1.

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

Texas. — College Bulletins 1–5, 1883–1887.

Washington. — 6th, 7th, and 8th Annual Reports, for 1895–96, 1896–97, and 1897–98 All Bulletins later than 27.

West Virginia. — Special Bulletin — Potash and Paying Crops, 1890.

Wyoming. — Bulletins 2 to 4, 9, and 10.

Ontario Department of Agriculture, Toronto. — Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).